



Natural Resources Institute

The University of Greenwich

**Kumasi Natural Resource Management Research Project
Inception Report
Volume 2 : Reports of Component Studies**

**Dr. Barry Blake
Prof. Kasim Kasanga**

**NRI : Project Leader
UST : Ghana Project Co-ordinator**

**Mr. Martin Adam
Dr. K. Nsiah-Gyabaah
Mrs. Judith Pender
Dr. S.J. Quashie-Sam
Ms. Hilary Warburton
Dr. Keith Williams**

**NRI
UST
NRI
UST
NRI
University of Nottingham**

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**Kumasi Natural Resource Management
Research Project
Inception Report**

Component study 1.
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Introduction

The overall objective of the study is to investigate and present an analysis of access, management and PT control of natural resources in peri-urban villages, and how these are affected by proximity to the urban centres.

The specific objectives are, at village level :

- To investigate the organisations involved in, and planning processes related to, natural resources;
- To investigate the stakeholders involved in access, control & management of land;
- To investigate the stakeholders involved in access, control and management of water, forest products, sand & stone;
- To assess constraints in peri-urban agriculture, particularly soil fertility;
- To explore how the village is developing & how the population is changing over time.

The study will also provide useful information to other concurrent projects associated with the NRSP NRM project, e.g. the NRSP Information Methods Development and the CPP Composts to Control Pathogens projects.

The NRI team commissioned 5 researchers from the University of Science and Technology (UST), under the guidance of Dr. K. Nsiah-Gyabaah, Acting Director of the Bureau for Integrated Rural Development (BIRD at UST as Lead Counterpart, to undertake the study. Overall co-ordination of the project work in Ghana has been carried out by Professor Kasim Kasanga of the Land Administration research centre (LARC) of the UST. These researchers were, in alphabetical order:

Mr. K. Opong-Nkrumah	LARC	Socio-economist
Dr. A. Owusu-Bi	BIRD	Planner
Ms. Tina Peprah	BIRD	Rural Development Specialist
Dr. C. Quansah	Dept. of Agriculture	Soil scientist
Mr. P. Sarfo-Mensah	BIRD	Agriculturalist

The guidance notes and checklists for the field work of the study were prepared by the NRI team and pre tested in the village of Apromase, Ejisu-Juaben district, by the joint NRI and UST team on 10th. and 11th. March 1997. The main field work in the six selected villages was carried out between 17th. March and 11th. April 1997. A first draft of the report from the UST team was discussed on the visit of the NRI team in May and a final draft from the UST team presented in June.

Contribution of study to project outputs

This PRA study contributes to project outputs 2.2, 3.1 and 4.1.

- 2.2 Land allocation and management systems described and the roles of stakeholders in management of land and other natural resources and their common interests and conflicting interests identified
- 3.1 Assessment of soil fertility, nutrient inputs and outputs over the range of farming systems
- 4.1 Assessment of development planning procedures at community and higher levels

Methodology

Criteria of village selection

The criteria chosen were that, in order for the villages to be reasonably representative of the peri-urban interface area, the villages should :

- 1) Be spread fairly evenly geographically around Kumasi and up to 40 km radius. This radius was arbitrarily selected as a guesstimate of the extent of peri-urban influences and likely to show some variation in the extent of the influence.
- 2) . 3:3 or 2:4 on:off (more than 2km) main tar roads; again, the hypothesis being that there are differences expected between these situations.
- 3)4:2 granite : phyllite geology; the team conferred with a senior soil scientist, who suggested that there might be differences in farming systems and potential for development on the soils of the two principal geological formations of the Kumasi area.
- 4) Have good potential to continue work in. The selection on the basis of this criterion was left to the PRA field team themselves to decide, it having been suggested that it would be difficult to continue further project work if there were local institutional problems within the village which might hinder official sanction for such work.

The selected villages have the following characteristics with reference to the above criteria:

No.	Village	Radial distance from Kumasi	"On" main tar road	Geology
1	Duase	8 km	No	Granite
2	Abuakwa	10 km	Yes	Granite
3	Daku	10.5 km	No	Phyllite
4	Swedru	15 km	No	Granite
5	Nyameani	28 km	Yes	Phyllite
6	Domeabra	30 km	No	Granite

Two of the villages (1 and 2) had been chosen for the RRA work in the baseline studies in 1996 and one (no.5) had been included in a horticultural survey in 1995. Visits to all villages prior to starting the PRA established that there were no reasons to believe that these would not be suitable for continuing work.

Methods used and participants in each village

Two days were spent in each village. The components of the survey were:

1. Participatory mapping:

- To facilitate villagers mapping the features which they consider of importance in the village, using plywood, chalk and charcoal

- To investigate perceptions of the development process

2. Discussion with Chief and elders group:

- History & development of village
- Control of and access to land, natural resources and services

3. Discussion with Queen Mother and women's group:

- Women's control of and access to resources and services
- Women's livelihoods
- Village development

4. Discussion with young men's group:

- Youths' control of and access to resources and services
- Youths' livelihoods
- Village development

5. Discussion with young women's group

- Youths' control of and access to resources and services

- Youths' livelihoods
 - Village development
6. Discussions with farmers as a group and individually
- Identification of farming systems
 - Identification of constraints, using problem ranking
 - Investigation of soil fertility perceptions of farmers
7. Soil analysis (carried out by staff of Soils Research Institute)

The agriculturalist and the soil scientist carried out the last two components. The rest of the survey team divided among themselves, and often switched roles and responsibilities for the other survey components. The guidance notes and structured checklists for the study are appended to this document as Appendix 7.

A reconnaissance survey was first undertaken at each village for the team to familiarise with the people, the traditional structure and the general view of communities. Scheduling of detailed survey days with the chiefs and elders were preceded by a short traditional protocol.

Discussion among the respondents took place before a conclusion was recorded as the response for the particular issue discussed.

At the end of each day, enough time was allocated for discussions among the research team about findings, observations and views on the village. Notes were then compiled on the findings.

Limitations of study

The team were confident that there was no unforeseen nor excessive bias in the answers received from the various groups of villagers and that the notes recorded a reasonably accurate impression of the situation in the villages. It goes without saying that the interpretation of the differing versions of information supplied by different groups of villagers contributes to the analysis of the study.

In most cases the participants in the mapping exercise, who were given a free hand to select whatever features they considered of importance, concentrated on the settlement area rather than the wider village land area. This has made it necessary to follow up with them, presenting copies of the original maps and requesting that the village land boundaries, which are in some cases indicated, are more explicitly shown. Orientation and scale were, as expected, inaccurate and the land use mapping exercise which has followed on from this PRA study has taken the participatory maps as a guide to the features to be mapped in greater accuracy using GPS equipment.

Presentation and Analysis of Results

Population

Changes in recent years and suggested reasons

Abuakwa shows the greatest population increase, from 4,000 according to the 1984 census to 15,000 according to informants' estimates - from village to town by the definition of the population census (5,000 and over). Only one (Daku) or possibly two (Nyameani also) villages reported net population decreases due to out-migration exceeding in-migration. Whilst in-migration has been either for farming or in the case of Abuakwa (and Duasi) for easy commuting access to the city, out-migration has in most cases been to the city (or perhaps one of the settlements closer to the city) to seek or engage in urban occupations. The number of displaced farmers who have moved elsewhere to continue farming was said to be not more than 10% of the population even in Abuakwa, where land use changes have been most pronounced. Table 1 compares earlier population census figures with the estimates given by the PRA informants.

Table 1. Population of PRA villages

	1960 census	1970 census	1984 census	1997 PRA est.
Duasi				15,000
Abuakwa				2,000
Daku				1,500
Swedru				1,500
Nyameani				3,000
Domebra				1,500

Apart from natural population increases of the indigenous population most of the villages reported significant inflows of migrants, mainly from the north of the country, who have mainly come to engage in farming. In one case m-migrants from the south have set up kente weaving in recent years (Domeabra) and in the fastest-expanding settlement, Abuakwa, the general attraction of the proximity to urban facilities has drawn in large numbers, such that the respondents estimate that only 60% of Abuakwa were "indigenous" to the place. In complete contrast, and even closer to the city centre, Duasi retains 90% indigenous population (in-migration and expansion in general is prevented by chieftaincy disputes). In only one village (Nyameam) was there a policy of non-allocation of plots to non-indigenes. Distance from Kumasi did not appear to be related to reported proportion of non-indigenous population; see table 2.

Table 2. Indigenous inhabitants as reported proportion of settlement's population

Duasi	Abuakwa	Daku	Swedru	Nyameani	Domeabra
90	60	80	90	90+	75

Changes in livelihoods and suggested reasons

The settlements trace their origins to hunters and warriors, who arrived for the most part from the south in the seventeenth century, soon taking up subsistence farming as well and then cash cropping, mainly of tree crops, particularly cocoa. As population increased so did pressure on the land to provide food,

and coupled with cocoa disease and poor prices this has led in the last fifteen years to an increased reliance on food crops of all kinds to provide cash income as well as subsistence. There appears, however, to be a recent revival of interest in tree crops, due to improved cocoa prices and increased demand for palm oil, and where there is sufficient land still available (all villages except Duasi and Abuakwa reported this) rehabilitation of old plantations and new plantings are taking place.

Agriculture remains the main source of livelihood in all but the two settlements nearest to Kumasi (Duasi and Abuakwa), either in terms of actual crop and livestock production or processing and trading in agricultural produce. However, there is a trend noted in all the settlements that agriculture is ceasing to be a primary occupation for many people and coming to have a secondary and supporting role. This is most noticeable amongst the younger people : young age men and women are generally not interested in traditional food crop farming, but if they remain in the village become engaged in crafts, and artisanal work, also vegetables and rice growing. These activities are mainly carried out by young men notably tomato farming at Daku and kente weaving at Domeabra (women are said to become barren if they engage in this craft).

The trend away from traditional food crop farming has affected the women much less than the men and in the further settlements (Swedru, Nyameani, Domeabra) 90% of the women still engage in farming, as opposed to 50-75% of men in the same settlements. Opportunities for alternative livelihoods within the village for women are restricted to trading, crop and food processing, dressmaking and hairdressing (there are apprenticeship schemes for these occupations as there are for the men's). However for many of them food crop farming also remains their responsibility; even in Abuakwa, it was said that 50% of women are engaged in farming, mainly on land outside the village's own boundaries, which suggests that they have to spend considerable time travelling to as well as tending the farms.

Urban influence on populations and livelihoods

In terms of direct influence, in the nearest settlements commuting to the city for work is important, especially in Duasi, but Domeabra seems to be at around the commuting limit, where only 10 people were said to commute daily to Kumasi : the people of this settlement depend far more on the local district capital of Agona for both markets and supplies than they do on the city. This conclusion is in agreement with that of the Urban Footprint study also commissioned by this project : both Nyameani and Domeabra are at or close to the outer limit of the commuting area as defined by that study. The higher number of commuters noted at Nyameani than Domeabra may be due to the closer proximity of Nyameani to the city : also the range of hills and the sparse settlement pattern beyond Nyameani appears to act as a more pronounced definition of the peri-urban boundary in this south-eastern sector.

Abuakwa is both a dormitory town for Kumasi and has substantial employment opportunities of its own or close by : sawmills, blockmaking sites, distillery, chemical formulation plant, corn mills and poultry farms. The presence of electricity and piped water favours the establishment of some of these enterprises and the expansion in the city's housing favours others.

On the other hand, the small kente weaving industry at Domeabra also looks to Kumasi for its market, as do the sugarcane farmers of Duasi, the tomato farmers of Daku, the vegetable and food crop farmers of Swedni and the rice producers of Nyameani. In all the settlements there are those who are taking advantage of the proximity of the city for market and supplies to provide them with livelihoods. Each settlement seems to have its own individual pattern of livelihood strategy adaptations to the peri-urban environment.

Village structure and organisation

Current structure and main organisations

The village authorities and organisations are summarised in table 3.

Table 3. Authority and organisations within villages.

Village	Chief	Queen mother	Assemblyman	Town (village) development committee	Other organisations
Duasi	Dispute, 4 claimants	None	Resident nearby	None	Churches, schoolchildren
Abuakwa	Resident	Resident	Resident	None	Religious, political, trade
Daku	Non-resident but visits regularly	None	Resident	Active	Religious, trade, CEDEP
Swedru	Resident	None, but 2 appointees	Resident	Not active	Religious, traders
Nyameani	Nonresident but visits regularly	Resident	Resident	Present	Religious, youth, trade
Domeabra	Resident	None	Resident	Active	Religious, political, trade

The chieftaincy situation in the villages varies considerably. In Duasi there is a long-standing dispute between four groups within the village, each of which has its own chief; whereas in Daku the stool is passed regularly between nine family groups without any reported problems. On the town development committees "(TDC)" there are in all cases more men than women, though the difference is only one at Swedru, where it was said that women were more active despite their other responsibilities, in contrast to Nyameani where it was said that they were averse to community politics. The composition of the committees is shown in table 4.

Table 4. Composition of village (town) development committees (TDC's)

	Male	Female	Total
Daku	6	1	7
Swedru	4	3	7
Nyameani	11	3	14
Domeabra	7	2	9

Where there is no TDC it was said that the assemblyman took the lead, although at Duasi the chieftaincy dispute had held up all forms of village development.

There are religious organisations in each settlement but only at Swedru was it noted that they were active in community development projects; at Daku they engage in communal farming activities. There are also trade associations (e.g. tomato growers, kente weavers, bakers) in every village, which provide support for members in need.

Urban influences

The planning and development management responsibilities of the TDC (town or village development committee) and the Assemblyman are specified under local government regulations. On the other hand

the deliberative and adjudicative duties of the chief and elders are conditioned by traditional norms. Direct urban influences on these structures cannot be distinguished.

However, in terms of general community cohesion the further settlements appear to have the advantage there was said to be good community spirit at Domeabra whilst at Duasi the comment was made that "individual development has succeeded communal development". In Duasi also it was noted that teenage pregnancy, theft and general insecurity were prevalent, whilst the other settlements were still anticipating the appearance of these "urban vices".

Facilities in the villages

Facilities and services within the villages

Abuakwa clearly leads in terms of facilities and services but apart from schools most of the other villages lack amenities. The shaded cells in the table below indicate the development priorities most commonly voiced by respondents.

Table 5. Facilities present in the villages.

	Duase	Abuakwa	Daku	Swedru	N ameani	Domeabra
Tarred road ^s	No	Yes	No	No	Yes (but ends here)	No
Water - pipe d	Few	Some	-	-	-	-
Water - borehole	2	-(?)	1	3	6	(2-wells)
Electricity, houses	Almost all	Almost all				
Schools	P, JS	Many	K,P,JS	K,P,JS	K,2P,JS	K,P,JS
Toilet maintenance	KMA	Privatised	Com'ty children	Com'ty children	Com'ty children	Com'ty children
Refuse dump maintenance	KMA?	Privatised	Com'ty women	Com'ty women	Com'ty women	Not recorded
Health centre		Many			Yes (
Police post						
Post office	-	Yes	-	-	Yes	
Telephone	-	Yes	-	-	-	-
Daily market	-	Yes	-	-	Yes (?)	-
Bank	-	Yes	-	-	-	-

K = kindergarten, P = primary, JS = junior secondary

At Abuakwa a hospital and permanent police post were suggested as development priorities. Renovations to schools were highlighted in three villages; vocational schools in two. At Nyameani a house for the nurses was prioritised.

Urban influences

Piped water and electricity has been extended to the two settlements nearest to the city - clearly a spin-off from the infrastructure provided for the city. Also, responsibility for village toilets has been taken over by the KMA in Duasi. Expectations are high in all settlements that electricity will be supplied to them in the next few years. Abuakwa happens to lie on a main tar road and Nyameani at the end of a tarred side road . neither of these could be said to be directly because of urban influence.

Land use

Types and balance of land uses

At Abuakwa the settlement area is said to have reached the village land boundaries and further developments may therefore be regarded as infill. It was estimated that 20% of the stock of housing was

in process of construction. The old residential area is surrounded by the new, with industrial premises also taking up space, and it was also estimated that 40% of the total village lands were occupied by housing and industry. In complete and anomalous contrast, the other village closest to Kumasi, Duasi, was said to only have 2 out of 89 houses uncompleted due to the chieftaincy dispute. Other settlements were reported as having proportions of housing under construction of 5 to 15 per cent of total stock (i.e. around ten houses per village). Much of the new housing is of the "villa" type, being of substantial concrete-block construction within large plots of at least 0.1 ha, although at Domeabra there are also a noticeable number of more flimsy wattle-and-daub structures put up by seasonal agricultural workers from the north of the country. Erosion between houses is particularly bad at Daku and Nyameani in the older high-density housing areas.

The last lands to be developed for housing are usually the valley bottoms and lower slopes, and these are largely under agricultural use in all the villages. However, at Swedru it was noted that there is competition for valley-bottom land between vegetable production and sand winning.

The participatory maps, in the making of which the villagers were given a free hand, tend to concentrate on the built-up area of the village, showing such features as churches, schools and corn mills and less often natural resources, merely indicating "farm lands", although streams, sand-winning sites, sacred groves, refuse dumps and farms of note, e.g. a community cocoa plantation, are also shown on some. The proportions of the different land uses are not accurately shown and the maps are being refined in a subsequent mapping pilot study exercise.

Changes and urban influences

The demand for land for higher-income housing in the peri-urban villages may be regarded as an urban influence since in most cases the owners of such development have derived income from urban-centered occupations, though they may have had an agricultural base in trading of farm produce or supply of farm inputs. The urban centre in question, however, may not have been Kumasi, but Accra or even London. Some of the new housing is owned by relatives of indigenous inhabitants; other, at a far higher plot cost to them, by non-indigenes.

The general population increase, both urban and rural, has increased pressure on land for food production; food of all types, both traditional staples such as cassava and "relishes" such as tomatoes. The city as a trading and distribution focus has provided the opportunity to those within easy access to profit from this demand, but, as we will see, other factors such as availability of water are also critical to the expansion of the area of some crops such as vegetables.

Land access and management

Agricultural lands

All lands are held by the stool in all villages except Daku and allocated to family heads, whilst some maybe retained by the stool. In Daku all lands are field b y the heads of the nine autonomous family groups. The family lands are the main source of farm land in the villages where land pressure is not so severe. However, because of demand for the higher-potential lands, for example those in valley-bottoms suitable for vegetables, sugar-cane and taro, tenancy arrangements and fragmentation of the lands farmed by an individual is most common. An individual farmer may have a cassava farm, a plantain farm, and a vegetable farm at different locations. This is the norm throughout the region. Similarly, the division between men's cash-crop farms and women's subsistence farms is traditional but is becoming more emphasised more men take up farming food crops for cash.

Traditional sharecropping arrangements called *abusa* (usually the tenant takes 2/3 of produce) and *abunu* (half produce s5ares to tenant and half to landlord) remain - the former for maize, the latter for cassava. However, there is a tendency for these to be replaced by other simpler arrangements such as "cassava-for-tomatoes", where the tenant grows tomatoes, for which he takes the income and then plants cassava for the landlord to use. Other non-cash systems exist for maize in which the tenant simply takes all the maize and the landlord gets the other crops such as cocoyams and cassava in the mixed system; and for cocoa where the tenant harvests food crops on condition that he or she plants and establishes cocoa. There is also an increasing trend for landlords to demand cash land rents. At Nyameani farmers complain that landowners demand a share of the polished rice crop instead of rent in advance for rice land, thus exposing the farmer to the risk of crop failure and the additional costs of polishing; also the share (40%) of the rice demanded is in their opinion too high. This tendency would be expected to arise where suitable land is in short supply.

Building plots

There are layout plans for the new residential areas of Duasi and Abuakwa prepared by the regional town and country planning office. At the latter over half of the plots have been sold. At Swedru the plan was done without contours, the chief took over land allocation from the TDC, but new allocations have been suspended pending the preparation of a new plan. There are no layout plans for Nyameani or Domeabra.

In most villages the allocation of is the ultimate responsibility of the chief . However, at Daku it is the autonomous family heads who allocate building plots in accordance with the layout plan produced by the chief, elders, TDC and the regional Town and Country Planning office. This is a long-standing arrangement and not of recent origin.

There is no compensation for the family landowner for farmland taken for housing at any of the villages, only for a growing crops, with the exception of Swedru where the landowner (family head) receives 1/3 of the income and 2/3 goes to the stool and TDC. However, building plots can be allocated by chiefs to original landholders and this varies from village to village; it can be as little as one plot irrespective of the number of plots demarcated from the original holding; however, the chief may have his "own" development plans as well as the town development committee's plans and can compensate former landholders there from.

Land taken for building may often be that of the women's subsistence farms, for example it was reported at Duasi that land close to the settlement formerly used by women for yam growing was now built over.

Urban influences

Land speculation, including that by institutions and, in one village, poultry farmers, is suspected to be becoming common, and in general, land availability and security of tenure are both dwindling, due directly and indirectly to population pressure. However, this could not be said to be an urban influence *per se*. The chiefs retain their traditional authority over land allocation; however, as more lands become swallowed up into low-density housing, unless the chief is strong enough to vigorously continue to press authority it is to be expected that the more urban characteristic of individual families becoming to some extent independent of traditional authority may be asserted even in such a strong chiefly culture as that of the Asante.

Access to and management of other natural resources

Water

There appears to be little if any protection of water resources, except at

- Domeabra, where there is supposed to be a prohibition on stream-bank cultivation
- Swedru, where tree felling is prohibited within 50 feet of a stream bank and sand winning within 25 yards
- Swedru and Nyameani, where there are tabu days on which certain streams should not be used for extraction.

At Duasi stream, used by those unable to pay charges for water from the standpipe, is heavily polluted from area.

Forest products

In all villages felling is not supposed to be done without the landowner's permission and, it was mentioned at Domeabra, permission from the District Assembly. Fuelwood is free but again landowners are supposed to notified for courtesy, as with other common property resources, which include fallen (but not plucked) fruits from bush trees, wild oil palms, herbs and bamboos for yam stakes (though becoming scarce). There is common access to bushmeat and fruits except in reserves. There is a government-set closed season for hunting, said to be August to October. Chiefs are supposed to be given a proportion of the catch of bushmeat if it is large. In both Daku and Nyameani the comment was made that the forest resources were still essential to the livelihoods of some, especially the poorest, people.

Sacred groves exist at Abuakwa, Daku, Swedru and Nyameani. These are controlled by a *twafohene* and penalties of sheep for infringements of tabus imposed. At Daku another sacred grove was converted to a community cocoa farm and then given out to local tenants on abusa system.

Sand and stone winning

There are 3 sandwinning sites at Abuakwa and 2 at Swedru, also 6 stone winning sites at Daku. Other villages do not have any such resources. In one village authority for sand winning was given by the family head (but the chief was informed); in others the chief has control and is required to be paid "drinks money". The district assembly is always supposed to be involved to authorise permits, but in practice may not be.

Environmental issues in general

Environmental issues were not often considered important by the informants in the PRA villages, except the water pollution problem at Duasi and erosion, drainage and refuse disposal problems within the residential area of Abuakwa. Bush fires are also a hazard, often started by hunters. Grasscutters, which can cause considerable damage to crops, especially rice, are in one village trapped by a young mens' *nnobua* group.

Urban influences










Whilst it would be expected that the urban population would increase demand for sand and stone and also fuelwood , this study did not reveal any significant effects, except perhaps the sand winning sites at Abuakwa. More and closer investigation would be needed to ascertain the urban demand for and supply of these resources.

Agriculture

Farming systems categorisation

Six principal groups of farming system were identified and these follow those defined in the baseline study report, with some additional sub-systems within the bush-fallow group. Table 6 following refers. Detailed descriptions of the systems can be found in the sections on the individual villages.

Table 6. Farming systems identified in the PRA villages.

System No.	System descriptor	Duasi	Abua kwa	Daku	Swe dru	Nya meani	Dome abra	
1	Bush-fallow / food crop (rainfed, mainly upland)							
1.1	Mixed cropping*	✓	✓	✓	✓	✓	✓ [□]	
1.2	Cassava-maize				✓		✓	
1.3	Cassava sole crop	✓		✓			✓	
1.4	Yam sole crop	✓				✓		
1.5	Maize sole crop			✓		✓	✓	
1.6	Rice sole crop					✓		
2	Sole crop vegetables (irrigated in dry season)							
2.1	Tomato		✓	✓ [†]	✓			
2.2	Garden egg			✓	✓			
2.3	Cabbage			✓ [†]	✓			
2.4	Cowpea			✓				
2.5	Cucumber			✓	✓			
2.6	Okra				✓			
2.7	Pepper				✓			
2.8	Watermelon							
2.9	Beans			✓				
2.10	Carrot				✓			
2.11	Onion							
3	Specialised valley-bottom cropping							
3.1	Taro	✓					✓	
3.2	Sugarcane	✓						
3.3	Rice		✓				✓	
3.4	Maize (for green harvesting) mix on residual moisture	✓	✓					
4	Tree crops	Underlining indicates some significance in village						
4.1	Oil palm	✓	✓	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	
4.2	Cocoa			<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	
4.3	Citrus			✓			✓	
4.4	Teak					✓	✓	
5	Backyard farms (banana / plantain / cassava / veges.)	✓				✓		
6	Livestock							
6.1	Freerange / part penned smallscale	✓	✓	✓	✓	✓	✓	
6.2	Intensive poultry	✓	✓	✓		✓		
6.3	Larger sheep flocks		✓	✓				
6.4	Cattle			✓				

* Typically maize-cassava-plantain-cocoyam-vegetables

□ Also beans and groundnuts mentioned

† Most commonly grown by young men

‡ Most commonly grown by women

Four farming systems are common to all the villages - bush-fallow mixed-cropping, intensive tomato production, oil palm and smallscale livestock production. Those found only in the villages closest to the city are sugarcane and green maize, with a tendency to dry rather than wet season vegetables also in these settlements and generally more intensive poultry units. Tree crops are more important in the further villages. This highlights the importance of the valley bottom lands, which as we have noted are usually the last to be developed for housing anyway, in the nearest settlements to the city, and the cultivation of tree crops only where there is still lower pressure on land for other uses. Individual villages have concentrations of activity on other crops such as upland rice at Nyameani and

cassava at Domeabra. It is perhaps surprising that backyard farms do not feature significantly in more than two villages; it may be that these were, as has been suggested, very much a creation of an earlier political regime and that both land availability and inclination now act against their continuation. However, many of the new "villas" do have such areas and perhaps these have not been included as they may not be associated with the term.

Indicators of peri-urban characteristics

There are some farmers who are taking advantage of the increased market opportunities offered by the city in growing such crops as green maize and sugar-cane and these are found in the villages nearest the city. Tomato production is an indicator of peri-urbanness, in that the city provides the main market for the crop : however, there are farmers supplying tomatoes to Kumasi market from areas as far away as 100km and their success would appear to be based on being firstcomers and having experience and reputation for reliable production of good quality crops. A small minority of farmers have set up intensive poultry enterprises. In many cases all these opportunities mentioned are being taken up by younger male farmers. It is however remarkable that there is a majority of farmers, particularly of women, *who* continue to farm on a bush-fallow system, who have not changed their fanning system substantially from traditional practice. Nevertheless, if they have a surplus, they too can tap into the market, which is still largely concentrated on traditional foodstuffs : it was however said that cassava growing is not profitable, either for sale locally or in Kumasi. Taro is becoming more popular, being easy to grow and profitable, but has a social stigma - those men growing it are said to lose authority and virility

Production constraints and urban influence

The result of the problem ranking exercise which formed part of the PRA is shown below.

Table 7. Weighted ranking of agricultural constraints for all villages

Problem
Lack of credit facilities
Inadequate extension services; high input costs
Pests (and diseases in two villages)
Land scarcity; lack of irrigation facilities
Theft of produce; price instability and restrictions to market access
Reduced soil fertility; high labour costs
Weeds; lack of crop storage facilities
Bushfires (sometimes caused by hunters); high land rents

The first two constraints are to some extent related since extension services are seen as having a major role in providing access to credit facilities. Credit from landowners to settlers for farms, and from traders to all farmers is common. The latter assures the farmer of a market. In two villages the respondents bemoaned their inability to form credit groups, mentioning that local moneylenders charged interest of 40% per month.

It may seem surprising that neither land rents nor labour costs figure very highly in the list of constraints since both are, on the information given, higher in the more immediately peri-urban settlements, land rents by a factor of 150-200% and labour rates by 125-150%. This may be partly due to the fact that room rents, which may be charged by landowners or farmers to commuters or labourers, are greater by a factor of 200-300% and as the rent is sometimes “worked” as farm labour this cancels out the higher labour rates to some extent, though contributing to monetary inflation.

It would not appear that the major perceived farming constraints are related to proximity to Kumasi

since there was no trend in weighting for villages with distance from the city. However, land scarcity, reduced soil fertility, high land rents and theft of produce could be seen as the result of the increased competition for resources in the proximity of Kumasi, but were raised by only some villages and not necessarily those nearest the city. Thus it appears that there is evidence of a general conception that the problems of near-urban farmers are not very different to those of others but that peri-urbanness does contribute some extra problems to the farmers' portfolio.

There are of course some advantages in proximity to the city, and these are seen by the farmers as ease of access to market for both sales and inputs. It was claimed that maize can be bought in Kumasi and transported to the village more cheaply than in the village itself, perhaps because the producers in this case do not retain any surplus in the village. In the long term most respondents believed that the disadvantages of proximity to the city would outweigh the advantages for farmers.

Crop-livestock interactions

These are limited to the feeding of crop residues, principally cassava peelings, to sheep in all villages and sometimes pigs. There is little use of poultry manure - none at all in two villages - and no use of sheep manure was reported. The reasons for not using manure most commonly given were lack of availability and bulk with its associated transport cost; in one case lack of knowledge and in one case the belief that sheeps' manure would spread weed seeds. The only village where use was said to be fairly common was Abuakwa, where there are intensive poultry farms within the village area or close by. Some opportunities to maintain soil fertility are surely being missed.

Soil fertility status

In order to characterize the soils of the villages, composite samples were taken from four of the farming systems identified to depths of 0-20 cm and 20-60 cm for laboratory analyses. A 60cm. deep minipit was then dug for each of the soils sampled and fully described in accordance with the FAO guidelines(FAO, 1990). The results may be summarised as in table 8 below.

Table 8. Summary of principal findings of soil survey.

Soil series arranged in groups in descending position on slope from summit and upper slopes to valley bottoms.

Soil	Villages present	Principal physical features	Principal chemical features	Principal limitations to agricultural use
Bekwai	Daku, Nyanaearii	Loam over gravelly clay loam	Good OM and N levels; low P moderate K'	'P' deficiency K deficient at Daku.
Kumasi	Domeabra	Sandy loam over concretionary clay	OM moderate, N high in topsoil Highly acidic Low P, K, Ca, Mg	Acidity, K and P deficiencies. Need to sustain OM level
Asuansi	Duasi " Abuakwa Swedru, Domeabra	Sandy loam over concretionary and gravelly sandy clay	OM moderate N high in	Some acidity, P : deficiency, K def. of Duasi Domeabra. Need to--sustain OM
Nzima	Daku	Loam over gravelly loam	Good OM and N levels, low P, moderate K.	P and (to lesser extent) K deficiencies.
Akroso	Duasi, Abuakwa, Swedru	Sometimes gritty sandy loam over gravelly loam.	Variable OM & N levels. Low P; variable K, Ca & Mg.	P deficiency. N & K also deficient at Duasi.
Kokofu	Daku Nyameani	Loam over sandy	Variable acidity, moderate OM, low P; variable K, Ca Mg.	P deficiency. Need to sustain OM levels Acidity and K deficiency in some soils
Nta	Duasi Abuakwa, Swedra, Domeabra	Loamy sand over sandy loam	Variable amounts '66all features..	Acidity, P&K deficiencies at Duasi & Domeabra. Waterlogging season; rapid drying in. try:
Oda	Daku, Nyameani	Sandy loam over sandy clay loam	OM & N high at Daku, moderate Nyameani. Other nutrients variable.	P deficient at Nyameani. Need to maintain levels.
Densu	Duasi	Sandy loam over mottled loamy sand	Acidic, high in K but low in P.	Waterlogging, acidity, low P, need to sustain OM.
Ofin	(None)			

Unfortunately the recording of cropping histories of the sampling sites and the farmers' assessments of the fertility of the particular site was not carried out and it is thus not possible to attempt to relate fertility status to previous land use.

Farmers' perceptions of soil fertility

The choice of a particular cropping system is determined by the objective of the farm household. In most cases, farmers would prefer the lower slope to valley bottom sites for rice, sugarcane, taro and vegetable production mainly due to the availability of water or nearness of streams to these sites. The preferred sites for tree crops (cocoa and citrus) and most arable crops (maize, cassava, cocoyam, plantain, yam, etc.) stretch from the lower slope to the summit.

Farmers recognise that soils along the catena vary in type, fertility and suitability for cropping. This recognition is evidenced in Table 9 below.

Table 9. Farmers' Classification of Soils

Topo-site	Conventional classification		Farmers' classification	Farmers' assessment of fertility
	Soils on Phyllites	Soils on Granites		
Summit and upper slopes	Bekwai Series,	Kumasi and Asuansi series	<i>Asase Korko</i> (Redsoil)	Considered fertile and suitable for almost all crops including tree like cocoa and citrus
Middle slopes	Nzima Series	Akroso Series	<i>Asase Tuntum</i> (Black Soil)	Fertile and suitable for arable crops and vegetables. Tree crops are also grown.
Lower slopes	Kokofu Series	Nta Series	<i>Afonwea</i> (mostly recognised as Sandy Soils)	Very good for tuber crops such as cassava; vegetables and oil palm
Valley Bottom	Oda Series	Densu and Ofin Series	<i>Aworaho</i> (soils near streams)	Sugarcane, taro, paddy rice and dry season vegetable production,

The above table illustrates that farmers have a general appreciation of the suitability of the different soil types for different crops, and are in agreement with the conclusions of soil scientists such as u in his work *Soils of the Kumasi Region* (1992). However, there is no evidence from this investigation that farmers appreciate the specific limitations of the particular soil types at particular sites. To some extent this is due to omissions in the field work, which might have provided some insights into this.

Although farmers recognize the varying suitability of soils for cropping along the catena, in some cases they may not have land at the preferred sites. In such situations they have to acquire the desired land under the prevailing tenurial arrangement. For example, at Nyameani most rice farmers are compelled to rent land for rice production because majority of rice farmers do not have suitable lands of their own.

Summary and conclusions

The study has provided a picture of contrasting change• lack of change, and adaptation to chaff in the peri-urban villages.

There have been and continue to be changes in land use, which are of two kinds:

1. More land used for agriculture at the expense of fallow and forest land.
2. More land used for building development, especially housing, at the expense of agricultural land.

Whilst both changes are common in then region in general, the latter is more pronounced in the villages closer to the city, except where there are special factors such as land disputes which hold up the spread of housing.

The lack of change is most apparent in the continuation of the farming techniques of the traditional bush-fallow system despite the shrinking fallow area.

Adaptation to change has occurred in that the traditional authority of the chiefs has absorbed a leading role in planning and development, whilst the TDC and village assemblyman rather than the district assembly shares rather than controls these functions.

Features of the villages, which may be described distinctively peri-urban which from this study it is suggested can be distinguished are as follows:

1. Increased opportunity for the sale of convenience foods such as cooked green maize and sugar-cane.
2. Increased number of intensive poultry enterprises.
3. Increased use of land for building development (see above).
4. Increased demand for land, labour and accommodation resulting in higher monetary values on these commodities. "Ready supplies of labour" as part of the original definition of peri-urbanness should perhaps rather be phrased "increased opportunities and competition for labour".
5. Increased demand, and consequent raised rental value, for valley-bottom land with available water.
6. Lowering of "community spirit" and increase in "individual enterprise".
7. Increase, or anticipated increase, in crime and insecurity.

The principal influences on development in the villages appear to be

+ Position on a main transport route as a "gateway" to Kumasi, as exemplified by Abuakwa where the village has expanded into a town with many urban facilities

- Dispute of traditional authority over land, which has, *inter alia*, prevented similar development in Duase

+ Access to and use of land and water for vegetable farming, as at the more "rural" Daku and Swedru, which should in turn inject capital into the local economy for development

INDIVIDUAL VILLAGE NOTES

Mr. K. Oppong-Nkrumah	LARC	Socio-economist
Dr. A. Owusu-Bi	BIRD	Planner
Ms. Tina Peprah	BIRD	Rural
		Development
		Specialist
Dr. C. Quansah	Dept. of Agriculture	Soil scientist
Mr. P. Sarfo-Mensah	BIRD	Agriculturalist

1 Duase

Position 1°57'W, 6°73'N. Duase is located within the north-eastern perimeter of Kumasi Metropolitan Area. It is about 5km from the city centre and 5km off the Kumasi-Mampong road.

Participatory village map

1.1 History/Origin

The people originated from Denkyira Wiawso during the time of Osei Tutu in the 17th century. They first settled at Dedesua behind the Oda river in Kumasi. According to the chief, Nana Opoku Ware, the then Asantehene married one of the settlers at Dedesua and resettled her at the current place Duasi. The Asantehene created a stool for his children with the woman. Later the other members of the Denkyira settlers joined them. From then on, subsequent chiefs settled their wives there and gave the children land. This has resulted in 4 groups (the Atwia, Abrade, Akusiase and Akwete) in the village, each with his chief. The Awete has a chief who is a woman.

1.2 Population and livelihoods

The estimated population according to the people, is around 2000 with 1050 registered voters according to the 1996 voters register. According to the key informants, the high number of registered voters was due to the fact that people from surrounding villages came there to register in order to get photo I.D. cards instead of thumb printed ones which was issued to people in rural areas.

The population is dominated by indigenes who form around 90% of the total. The remaining 10% are migrants from other southern part of the country and few Northerners. The population increase, according to the people, is by natural increase. In and out migration of both strangers and indigenous people are about the same. There has not been any significant change in population movement into and out of the village. Few migrants moved into the village mainly for accommodation to take advantage of the lower rent advances. Though rent per room per month is between 3000 and 5000, rent advances are as low as around 300,000 (as paid by one settler) compared with 500,000 to 600,000 charged in Kumasi. The indigenes who move out are mainly farmers in the other regions like Brong Ahafo and Western regions. Others have moved to find non agricultural jobs in areas like Accra.

1.3 Economic development - overview

The original occupation of the people was farming and this is giving way to non-agricultural jobs. Though many of the people are farmers, half of them use fanning as their minor occupation. Most of the elderly men are farmers with about half of them having their farms in the village and the rest who are mainly cocoa farmers have their farms in the other regions. Those with farms in the village and in nearby villages undertake mainly food crop farming.

According to the youth, about 20% of them undertake fanning as major occupation. The rest do it as minor occupation. They do food crop and vegetable farming especially cabbage and lettuce. About 75% of the women are farmers with most of them fanning in the village and the rest in the distant regions, mainly as cocoa fanners. Few of them have farms in the neighboring villages of Kenyasi, Sepe and Manhyia. They mainly undertake food crop farming. Some migrants from the North also undertake sugar cane fanning. Few of the female youth undertake fanning. Other occupation undertaken by the people are trading and trades like craft works, shoe making and dressmaking. There are also some public servants and construction workers.

1.4 Detailed analysis of farming systems

1.4.1 Farming systems categorisation

The following farming systems were identified :

1. Bush fallow food-crop farms
 - maize-cassava-plantain-cocoyam-vegetable-intercrop
 - yam and cassava sole cropping
2. Intensive vegetable production as sole crop -tomato, garden eggs, cowpea, cabbage, cucumber.
3. Valley bottom mixed farming
 - production of taro, sugarcane and vegetables
4. Tree plantation
5. Backyard farms
6. Livestock production
 - free range small scale household production and commercial poultry farming

1.4.2 Characteristics common to all farming systems

1.4.2.1 Inputs

Farmers who do intensive vegetable production as sole-crop were mentioned as the major users of agro-chemicals, both fertilizers and insecticides. Farmers procure their agrochemicals from Kumasi. It was indicated that most farmers in the settlement do not use fertilizers because of the believe that fertilizers destroy the quality of cassava especially its taste and texture when used for fufu. It was emphasized that cassava produced from the locality is regarded among the best quality cassava sold in the Kumasi market and farmers want to maintain the tradition.

Local farmers have knowledge of the use of organic manure but almost all farmers do not use manure for cropping. The explanation given for this behaviour of fanners was that manure is not readily available in the community and could be obtained in larger quantities from Kumasi, and that the handling cost (i.e. transportation) will be very high. Some farmers also said that they did not use manure because they fallow their plots. There is however one commercial poultry farmer who uses manure regularly for food crops and vegetables production. He indicated that two farmers in the community have also used manure (not sold) from his farm and they came back for more but he did not have enough to supply them.

Farmers use a combination of local and improved varieties of crops. Most farmers grow improved maize varieties mainly Obatmpa and Abelehi. However, farmers complained that these varieties are easily attacked by insects when stored in the traditional form. Vegetable farmers use improved varieties. Most of the cassava produced in the locality are of the local varieties. Fanners indicated that the improved varieties are not good for fufu. They however acknowledged that some of the improved varieties (especially the white cassava) are high yielding but most fanners prefer to grow

the old varieties.

Most farmers use both hired and family labour. Labour rates vary according to the particular farm activity. For example, land clearing and preparation as well as weeding is 4000 Cedis (excluding food) per day (i.e. from 8 am to 12 pm). On the other hand, the rate for planting of cassava is 3500 Cedis. Farmers indicated that labour is not scarce but expensive.

Most indigenous farmers use family land for farming. Sharecropping and land hiring are however common in the locality. Maize is abusa in favour of tenant while cassava is abunu with the tenant providing all inputs apart from land. Land hiring is negotiated and rents are not charged on acre basis. Farmers indicated that rent for maize and tomatoes are lower than cassava. For tomatoes there exist also the an arrangement whereby the tenant grows cassava for the landlord after harvesting the tomatoes. In this case the tenant does not pay any rent. Generally, farmers admitted that land for farming has become scarce due to the selling of farm plots for building.

1.4.2.2 Outputs.

Farmers were unable to estimate yields and could only say that their farms have reduced considerably (about one-third lower) when compared with yields they obtained 5 years ago. They attributed reduction in total yields of major crops (cassava, maize, cocoyam and plantain) to the low fertility of soils (attributed to annual bushfires), crop destruction by pests (termites, grasshoppers and millipedes) and crop stealing. They emphasized that yields of vegetables are comparatively better because the farmers use fertilizers and pesticides.

1.4.2.3 Marketing and storage

Most food crops produced in the settlement are sold in Kumasi. Local women traders buy from the farmers and sell direct to their customers in Kumasi. Some traders from Kumasi also come and buy from the farmers. For example, cassava is mostly sold direct by both farmers and local traders in the Kumasi market. There exist also the arrangement where farmers contract local traders (mostly women) to sell their cassava for a fee. These traders act like agents for farmers. The farmer does the harvesting and loading while the agent uses her market information to maximize returns. Maize is mainly sold fresh (cooked) in Kumasi. It was mentioned that maize marketing in the fresh form is major seasonal occupation for both men and women in the locality. Dried maize is mainly stored for food and as seed.

Taro and sugarcane are the only crops that sold solely by farmers to customers directly in the community. Buyers come mainly from Kumasi and are taken to farms to buy their requirements. Taro is mainly sold during the hunger period (March to July).

Maize is the only crop that is stored albeit in the traditional form with little or no agrochemical. All other crops are sold as and when they are harvested. Some cassava is processed into chips.

1.4.2.4 General constraints

Farmers ranked constraints to fanning in the locality as the following:

Problem	Score
Credit(lack of)	6
Inadequate extension services	5
Pest attack	4
Pilfering and stealing	3
Weeds	2
High cost of inputs	1
Group-Hunters	0

Farmers indicated that they have had no access to credit facility before. One elderly male respondent attributed this to the absence of farmer associations. The farmers also emphasized that the absence of an extension officers in the settlement could also affect their chances of receiving any credit facility especially formal credit.

Most farmers expressed the need for extension services and regretted the current situation where no extension officer comes to the settlement. Farmers' perception was that the extension department thinks that farming is not active in the settlement due to its nearness to Kumasi.

The farmers complained about the increasing population of termites (white) which destroy cassava, and yam, and the increasing menace of grasshoppers which cause massive destruction to leaves of cassava.

It was mentioned that local people steal a lot of farm produce. One female farmer who had recently lost farm produce worth about 200,000 Cedis attributed the situation to the current land litigation and chieftaincy disputes in the settlement. It was also indicated that there are also people who steal farm produce not on the grounds of litigation but to eat and sell. The stealing was also attributed to the expansion of Kumasi to the settlement and the development of building plots close to farms. It was alleged that these new settlers do not only steal farm produce but also defecate in the nearby farms.

Group hunters from Kumasi seasonally come to the settlement during the dry season(November to March) hunt game. Farmers indicated that the group hunters indiscriminately slash fallow lands and set them on fire to trap game. They also steal food crops and burn farms during hunting.

Farmers in the locality are also worried about the prevalence of invasive species especially *Imperata* and *Centrosema* species. They attributed the spread of these species to the use of fertilizer for tomato production in the settlement. They also thought the loss of soil fertility was especially responsible for the spread of *Imperata*.

High cost of farm inputs was related mainly to cutlasses. Farmers felt the current price of a cutlass which is between 6500 and 7500 Cedis was too exorbitant. Marketing problems were related to low prices offered for farm produce and the lack of storage and processing facilities for vegetables.

1.4.3 Management of specific farming systems

1.4.3.1 Bush fallow food-crop farms

The bush fallow food-crop farming system in the locality comprise maize-cassava-plantain cocoyam-vegetable-intercrop, cassava, yam and vegetable sole cropping.

Mixed cropping

The seasonal calendar for the maize-cassava-plantain-cocoyam-vegetable intercropping system was given as:

Jan-Feb.	land clearing and preparation
March	Planting - maize, cassava, plantain, cocoyam sprouts naturally, vegetable grown on ant hills, ring beans grown close to trees.
April	First and second weeding.
June	Harvesting of fresh maize and vegetables
July ending	Harvesting of dry maize
August	Harvesting of some cassava and replanting of cassava
October onwards	Harvesting of cocoyam and cassava. Harvesting of cassava is tied to prevailing market prices.

Land clearing and preparation is done mainly with hired labour as well as the planting of cassava. Most farmers do planting of maize with *nnoboa* system(a sort of a local labour cooperative system). Hired labour is also used to harvest cassava with labour rates ranging from 1000 to 2000 Cedis per day.

Mixed croppers do not use fertilizers for the reasons stated earlier that fertilizers destroy the taste of cassava. These farmers also think that the fallow management can equally restore fertility of the land and improve yields.

Sole cropping

Cassava is produced as a sole crop on commercial scale. It was indicated that sole cropping of cassava is done by the youth who do tomato as sole crop. The cassava is planted after harvesting the tomato to allow the crop benefit from the fertilizer used in the production of the tomato. Most of these farmers grow improved varieties of cassava.

Sole crop yam is done on lands that are close to the settlement especially by women. Varieties grown are Northern Ghana extraction which are noted for their ready market in Kumasi. Farmers complained that due to the expansion of the settlement almost all the lands close to the settlement have been sold and therefore very little land is available for yam production by this approach. Farmers explained that they would not use distant lands for production due to the high rate of pilfering of yam farms.

1.4.3.2 Intensive sole-crop vegetable production

Vegetable sole cropping is regarded as one of the most lucrative farming systems in the locality. Crops grown in the order of importance are tomatoes, garden eggs, cabbage, okra and cowpea. Farmers do both wet and dry season production. The wet season production is done mainly on the middle and upper slopes while the dry season farming is done on the lower slopes and valley bottom. It was indicated by farmers that most of the vegetable is produced in the dry season because of the higher prices vegetables attract during that period.

The dry season production is done mainly in the valley bottoms around two perennial streams (Susan and Mpakroma) in the settlement. Some farmers who use the lower slopes dig their own wells while others use hired labour (mostly women) for water fetching. It was mentioned that the valley bottom farmers are mostly migrant farmers from Techimantia, an important vegetable production community in the Brong Ahafo region. These migrant farmers who are mostly youth come to the community during dry the season to hire land in the valley bottoms and the lower slopes for tomato production. These farmers have created high demand for land in the valley bottoms and rates charged are exceptionally high and range between 40,000 to 60,000 Cedis per plot (not in acres) per season. It was emphasized that these farmers come to the settlement to take advantage of the closeness of the settlement to the Kumasi market.

The dry season vegetable production in the settlement is done between September and December. The wet season production is tied to the normal seasonal calendar for crop production. The production activities include normal intensive production operations: land preparation and ridging, watering, nursing of seeds and transplanting, weeding, fertilization, spraying and harvesting. It was mentioned that majority of the farmers in the settlement sell their produce direct to customers in Kumasi.

Cowpea is also done as a sole crop mainly in the wet season on the middle slopes. It was indicated that some farmers grow cowpea in rotation with sole cassava production. Farmers mentioned the threat of attacks by snakes as the major constraint to the production of cowpea. Water melon on the other hand is grown by some farmers in rotation with wet season tomato. Cabbage and cucumber are grown alongside with tomatoes by several farmers on lower slopes and valley bottoms.

1.4.3.3 Specialized valley-bottom farming

This comprise a combination of sole taro and sugarcane production, and mixed cropping of vegetables and maize.

Taro

Fanners acknowledged that taro production is very lucrative and fetches a lot of income but many farmers cannot do it because of scarcity of suitable land. They emphasized that taro does well in the valley bottom and lower slopes. However, these lands especially valley bottom land, has become scarce due to its high demand for vegetable and sugar cane production. It was mentioned that very few fanners are able to do taro production even though several farmers desire to produce taro. These farmers are those who have family lands in the valley bottom and lower slopes. Taro production has

therefore become the specialty of the indigenes.

Taro is produced as a sole crop and local varieties are used. Farmers mentioned that its production is not difficult. They attributed this to the canopy that taro easily forms which considerably reduces weeding. More importantly, they emphasized that once established, a taro farm requires little or no replanting after harvesting because the crop sprouts within a short period and spreads very fast.

Farmers also indicated that taro has ready market and traders from Kumasi always come to the settlement to buy, and are prepared to buy whatever output farmers are prepared to sell. An average size corm of the crop was sold between 500 and 1000 Cedis last year.

Sugar cane

The crop is produced on beds in valley bottoms and lower slopes. It is produced mainly by northerners *who* rent land from the local people. The rent is re-negotiated every year and landlords are said to take a lot of money as rent. It was, however, emphasized that the tenants still make a lot of profit. It was indicated that local people would have preferred sharecropping but the tenants are believed to have colluded to disagree. No landlord would find any tenant who would do sharecropping. These tenants who live in Kumasi were reported not to use hired labour but mainly their own labour and that of family members.

The indigenous people perceive sugar cane production as too laborious and that it causes a lot of skin scratches and rashes. They recognize, however, that sugar cane is the most profitable farming system in the locality.

Sugar cane farmers grow local varieties. The major problem of farmers was mentioned as attack of crops by stem borers and termites. Farmers use agro-chemicals (mainly DDT) against insect attacks. The farmers also do cabbage production as well on selected portions of their plots but never mixed with sugar cane.

Sugar cane is marketed in the settlement. Farmers come from Kumasi to buy. The crop is sold per stem and prices depend on the stem size. An average sized stem can sell for 500 Cedis.

Mixed cropping of maize and vegetables.

Valley bottom farmers do mixed cropping of okro, garden eggs and maize just before the rains set in. This system is mainly practiced by the northerners who have rented valley bottom lands. Much of the okro is not sold but used by the farmers. The maize which is done as early maize is mostly sold fresh to local women *who cook to* sell in Kumasi. It was indicated that farmers obtain very good prices. The garden eggs are also sold in Kumasi.

1.4.3.4 Tree crops

No cocoa farms exist in the settlement. The only tree plantations in the settlement are a 4-acre teak plantation established by the forestry department along the banks of the Susan stream in the settlement and a 1-acre backyard oil palm farm. It is noteworthy that the stretch of the teak

plantation covered some part of the local primary school but the school and the town authorities felled these trees. The reason was that the forestry department has the motive of permanently occupying the land. Apparently, the land involved had been allocated by the settlement for the development of a school park and for private property.

Local farmers said that they were not interested in tree crop farms because most of the farm lands in the settlement have been zoned for building and that farmers may not be lucky to benefit from investment in tree systems which usually have longer gestation periods.

1.4.3.5 Backyard farming

Backyard farms are mixed cropped with mainly banana, plantain, cassava and vegetables (garden eggs and pepper). It was indicated that banana was an important crop grown on the outskirts of the settlement about ten years ago. Several families derived supplementary income from the crop which had ready market in Kumasi. Currently, however, the production of the crop, according to farmers, is virtually non-existent in the settlement. They said most of the land used for its production have been sold for building.

Similarly, the production of other crops in the backyard is said to be on the decline and only a few farmers still maintain backyard farms. For example, an old female farmer who has kept a fifteen year old oil palm farm which has now been caught up by the expansion of the settlement indicated that she has been under constant pressure to fell the trees. Her suspicion was that the land has already been sold for building.

1.4.3.6 Livestock production

Livestock production in the settlement is done at the household and commercial levels. At the household level animals are kept for both domestic consumption and as security against emergency cash demands. The animals, mainly sheep and fowls, are kept on free range. Goat is tabooed. Farmers emphasized that livestock production at the household level has become popular in the settlement because of the ready market it has in Kumasi.

There are two commercial poultry farmers in the settlement. The farmers are indigenes and use family lands for their production. They both practice deep litter systems and keep cockerels, broilers and layers with average capacities of 1500 cockerels; 1400 layers; and 1200 broilers. One of the farmers has started pig production. He said feeding pigs was relatively cheaper because the feed inputs are comparatively cheaper. He said he prepares his feed from rice and maize bran with some purchased concentrate.

They said however that all inputs are obtained from Kumasi. Both farmers complained about the high cost of feed. For example, maize is purchased at 100,000 Cedis per maxi bag and fish meal at 91,000 Cedis. The farmers thought that this has discouraged several young men in the settlement from going into poultry production. The farmers also complained about the high cost of transportation, disease attacks (Newcastle) and lack of extension services. One of the farmers indicated that he has never been visited by an extension officer since he started operations about 5 years ago.

The farmers said they have good market for their produce. They indicated that traders come from Kumasi to buy eggs, cockerels and broilers. A crate of eggs is sold for 4500 Cedis; cockerel, 5000 Cedis; and broilers, 1500 Cedis.

1.4.4 Indicators of peri-urban characteristics

Farmers perception was that the settlement has almost become a suburb of Kumasi and that they no longer regard in the settlement as that of a typical For example, they mentioned that farming in the settlement has become more dependent on the Kumasi market than previously. Farmers can easily market their produce and also obtain inputs within short period of time.

Farmers also mentioned the increasing incidence of stealing of farm produce as an indicator of the changing farming conditions in the settlement and attributed this as a trait of urban fanning. They said previously village rules and regulations served as checks to farm produce stealing.

The growing interest of farmers in the production of livestock and Vegetables as well as taro and sugar cane was attributed to the nearness of the settlement to Kumasi. One poultry farmer emphasized that as Kumasi expands towards the settlement and more lands are bought for building, farmers will be left with no option but to do intensive backyard livestock production, valley bottom and lower slope farming. He said that taro and vegetable production have already become popular in the settlement especially among the youth, and several households keep sheep.

The increasing interest in food processing and selling of most maize produced in the settlement in the fresh form were attributed to the nearness of the settlement to Kumasi. For example, farmers said that very few farmers now store maize because cooked fresh maize has good market and gives farmers quick and ready cash income. Also, several farmers produce cassava chips which has good market in Kumasi.

1.4.5 Farming systems constraints affected by urban pressures

Of the farming constraints mentioned by farmers(see 1.4.2.4) the lack of extension services, stealing of farm produce and the activities of group hunters were identified as those that were the direct result of the settlement closeness to Kumasi.

Farmers did not identify land as a constraint in the settlement at the moment. It was, however, emphasized by farmers that farm distances have increased because all farm lands close to the settlement have been sold as building plots. One farmer attributed the temporary reprieve from land scarcity to the chieftancy dispute in the settlement. His anticipation was that as soon as the dispute is resolved there would be an unprecedented sale of lands in the settlement for building because of the pressure from people in Kumasi for building plots in the settlement.

When farmers were asked about the advantages the closeness of the settlement to Kumasi has on farming, it was mentioned that marketing of farm produce has improved considerably as result of

improvement in transportation. They emphasized that traders frequently come to the settlement. It was also indicated that farm produce such as taro, palm kernel, sugar cane and cassava chips that did not have good market now has ready market. However, farmers were of the opinion that land for farming lands would soon become scarce and that crop stealing would also assume greater dimension. Most farmers thought that the expansion of Kumasi would have greater negative impact on farming in the settlement than positive gains.

1.4.6 Crop-Livestock interactions.

Crop-livestock interaction in the settlement is restricted mainly to the use of crop residue for the feeding of sheep. Most fanners supplement the feeding of their sheep which do mainly free ranging with cassava and plantain peels. Little or no use is made of the dung of these animals. In fact; no effort is made by fanners to collect the dung for farming. However, most fanners have knowledge about the importance of organic manure in farming. Fanners mentioned that they keep few animals and therefore cannot obtain adequate organic manure from their animals, and transportation of manure from Kumasi would also be too expensive.

As indicated earlier(see 1.4.3.6) only one farmer in the settlement regularly uses poultry manure for fanning. He uses the poultry dropping from his own poultry farm. He indicated that he does not achieve good result from cassava production because the tubers rot. However, he acknowledged that plantain, cocoyam and maize do very well with poultry litter.

1.4.7 Soil fertility status related to farming systems

Farmers perceptions of soil fertility

Farmers in the community use the length of the fallow period as a measure of soil fertility status. Farmers emphasized that the longer the fallow period the better the soil regenerates its fertility. They suggested a minimum of fallow period of four years. Some of the farmers pointed out that undisturbed fallow period is also important for the soil to regain its fertility. The colour of the soil is also used to determine its fertility. Farmers mentioned that black soils are fertile.

Farmers acknowledged that fertility of soils in the settlement has reduced considerably. They attributed the loss of soil fertility in the community to:

- reduced fallow periods(from an average of 5 to 2 years). Farmers emphasized that most fallow lands are burnt by group hunters and annual bush fires and this delays fertility regeneration.
- loss of trees.
- soil erosion. Farmers linked this to the loss of tree cover.

Most farmers believe that soil fertility can be improved through fallow management, the use of organic manure and tree planting. It was mentioned that the use of poultry droppings for farming was practiced by their ancestors and hence not new to them.

1.5 Trade and commerce

The other occupation undertaken by women are trading and trades such as hairdressing and sewing. The traders mainly deal in items of household use such as fish, charcoal, and vegetables. Some also undertake trading in prepared food.

Some of the traders also operate kiosks and deal mainly in provisions and other consumables. Some of the women commute to Kumasi to trade in food crops, hard ware and second hand goods. The young men who are traders also deal in hardware and secondhand goods.

1.6 Industrial sector

The industrial occupation in the village is mainly in the light industrial sector. About 50% of the male youth do non-agricultural jobs such as shoe making, carving, construction, trading, and other manual work. The apprentice shoemakers and carvers however take their produce to Kumasi to sell them.

1.7 Other occupations

There are few professional and salaried workers in the village. The young and active population undertake other jobs such as land clearing for wages. Daily wage for land clearing is ₵2500 with finch supply. A farmer however pays extra ₵500 if he is not able to supply lunch. Destumping attract a wage of ₵3000. The women mainly undertake weeding and charge a wage of ₵2500 without lunch. There is therefore a wage bias against women.

Currently due to environmental factors and pressure on land, there can be seen the emergence of non-farm occupation as shoe making, carving and trading and seamstressing and hairdressing.

1.8 Village structure and organization

1.8.1 Village structure

The village is directly under the Asantelnene. The status of the chief is that of a divisional chief under the Asantehene. There are 4 chiefs (3 men and 1 woman) who are autonomous each controlling his/her portion of the village and corresponding land. The village does not have a substantive queenmother.

Administratively, the village is under the Kumasi Metropolitan assembly. There is an assembly man who represents the community and a couple of other communities in the Metropolitan assembly which sits in Kumasi. The man however is resident in Kumasi and visits the village almost every week

1.8.2 Non governmental organizations

There are few organisations in the village. According to the people, there is litigation between the chiefs as to who is the rightful chief in the village. Because each chief controls his/her portion of the village, there has emerged division in the village people. There is no Town Development Committee or Unit Committee. The only identifiable organizations are the Students Union and Church Organization.

The Students Union comprise second and third cycle students in the village and they usually undertake cleaning/sweeping the main street in the village. There are 6 religious organizations involving men and women. The Catholic Church has provided the town with 1 bore hole. The litigation in the village has dampened the communal spirit leading to lack of project initiation by the people. All the projects in the village are outside funded projects. The influence of Kumasi has also affected the socio-economic and cultural life of the people that with many of them moving to Kumasi and back, little time is spent to make them think about the village. Individual development lids superseded communal development.

1.9 Facilities in the village

Facilities in the town include pipe borne water, bore hole, electricity, toilet and school. The pipe borne water from Kumasi is extended to the village. However, its flow is not regular and few houses are connected to it. There are 2 bore holes (one in good condition and the other broken down) built by the Catholic church. They control them and charge ₵ 10.00 per bucket. There is one stream in the village. It flows throughout the year however the KMA dumps refuse near it and therefore drains into it and has polluted it. It is now used mainly for washing.

There is electricity in the village and it was installed in 1991. Almost all houses are connected to it. There is a stream of schools comprising 1 primary and JSS all located in one compound. The bore hole is maintained by the Catholic church and the toilet by the KMA.

For other facilities such as health and communication, telephone and post office, the residents travel to Kumasi which is just 5km away. There is no on-going project being undertaken by the community. All projects in the village are undertaken by outside organizations or institutions.

1.10 Land use

The village is connected by a graveled road to Kumasi and the other villages notably Kenyasi. The village landuse consists of the built up area surrounded by farm lands, fallow land and cemetery. the built up area consists of houses, school, churches, the main road traversing the village and open spaces. According to the people there re about 82 numbered houses, 5 unnumbered and 2 uncompleted houses. The few unnumbered and uncompleted houses shows the slow expansion in housing in the village. According to the people, even these houses are being built by indigenes. The expansion in the village is not able to meet the demand for accommodation. This thus is one factor that has militated against the indifference in in-migration and out-migration in the village for both strangers and indigenes.

The road expands over 100 feet and the carriage way was tarred, it has now developed into graveled surface and during the dry seasonal produces a lot of dust. There is erosion and drainage problem that affect foundation of houses.

The farm lands comprise food crops and vegetables. Vegetable farms are mainly along the stream and valleys. Fallow lands are left between 1 and 3 years. The short fallow periods explains the pressure on the land due to population increase and the increased invasion of spear grass. There is no sand and stone winning in the village. Over the past decade there has not been any major expansion in village especially housing as a result of the litigation.

1.11 Land access and management

Each of the four chiefs is autonomous and controls his/her portion of land and allocates plots. There is a layout plan for the village prepared by the Regional Town and Country Planning office. Plot sizes range between 30 x 25m and 30 x 30m. Many of the plots have been sold out by the respective chiefs to both indigenes and strangers. Indigenes pay "drink money" which is of fixed and depends on the relationship with the chiefs. Strangers however pay €3.5 million. Development has however been stopped because of litigation over rightful owner of the land in the village. The case is now pending in the courts and therefore injunction has been placed on all developments.

Families whose lands are allocated for housing are not compensated either in cash or in kind. In farming, local farmers have access to family lands. However, population pressure has affected lands and some families are short of land. Such family members consult other families or individuals for land based on terms. Some also contact families in other villages. Strangers also contact families with land based on terms as indigenes. The usual hiring and share crop arrangements exist.

There is no fixed charge for hiring of land. For vegetable farm, prices range between €20,000 to 50,000 for 2 years. Share crop only exists. Tenant provides the inputs and where only maize is planted, then it is shared into two. Where other crops are planted alongside maize, then the maize may not be shared. It is only the cassava and other crops that are shared. Access to land is not the same as in the past 15 years. Increased population has reduced land sizes available. Full scale vegetable farming is emerging and hiring of land has increased due to competition between demand and the supply. Due to litigation, development has virtually grounded and people (both locals and strangers) are now going to the nearby villages for housing development.

1.12 Access to and management of other natural resources

There is no restriction on access to water. The only stream is polluted by the KMA by dumping refuse at the upstream. This has polluted it and therefore not used for drinking. People weed close to the stream and there are no taboo days in which the stream is not visited.

With the exception of timber, all forest products - fuel wood, medicinal plants and wild growing oil palm are common property, and individuals do not need special permission for access. Hunting is allowed but it is not the practise of the village. There is no sacred grove. Sand and stone winning has been banned in the village due to litigation between the chiefs.

1.13 Development of the village

Apart from the electricity and the borehole, there is virtually no development in the village even in terms of housing. However in the next 10 years, the peoples priority projects include provision of water, tarring of the main road, expansion in school to include kindergarten and completion of the JSS block. There are opportunities in terms of the peoples will to contribute to development. There are prominent people in the cities who are ready to contribute in cash and kind towards provision of facilities in the village. The urban influence has already caught up with the people and social vices like teenage pregnancy, theft and general insecurity exist. However they expect further escalating of these vices in the near future. The only problem is the litigation in the village.

1.14 Urban influence

The influence of Kumasi on the socio-economic life of the people is facilitated by the need of such services as non-farm occupation and improved transportation. Currently many trotro ply the route between Kumasi and beyond the village, making many trips a day. According to the people, about 500 people travel daily to and from Kumasi to undertake their economic activities and for shopping. Though who engage in trading and construction activities mainly work in Kumasi and nearby villages. The village also serves as dormitory town for public servants who take advantage of the low rents and work in Kumasi. Foodcrop and vegetable farmers mainly sell their produce 'in Kumasi. The shoe making and carving work done by the youth are all sold in Kumasi thus offering a market for the agricultural and non-agricultural activities in the village.

2 Abuakwa

Position 1°71'W, 6°70'N. Abuakwa is about 1 lkm west of Kumasi and located on the main Kumasi-Sunyani road in Atwima district. It is also I lkm from Nkawie the district capital.

Participatory village map

2.1 History & origin

The original people of Abuakwa are of the Ekoona clan which migrated from Denkyira-Abuakwa during the reign of King Osei Tutu. According to the Krontihene of Abuakwa, they came during the Asante war with Denkyira. Their original occupation was farming and the women dominated in the farming occupation. This pre-supposes that the men may have been warriors who defected. This may be confirmed by the fact that their first contact was the Asantehene who gave them to the Gyasehene, Nana Buabasa. At that time, the only suburb in Kumasi was Bantama. The Asantehene did not want them to settle far so Nana Buabasa settled them at their present occupation. The name of their previous settlement Abuakwa was however adopted for their present settlement. The people do not serve any paramount chief. They serve directly the Asantehene.

2.2 Population and livelihoods

The current population, as estimated by the people, is around 15,000 with 6,500 registered voters. In 1984, the population was 4000 but this has grown to the present figure due to the housing development that has taken place within the last 10 years. Abuakwa is therefore a town by Ghanaian standard (settlement with population 5000 and above is considered as a town). The population comprises mainly of indigenous people who form about 60%. The rest are migrants from other parts of the country. There are also people who are non-Ghanaian from Burkina Faso and Togo. The high proportion of migrants shows that population increase is both by natural increase and migration. According to the people more migrants are moving into the town mainly for accommodation (either to rent rooms because of cheaper rents or to build houses). There are also equally more indigene return - migrants who are moving back to live in family houses or rent rooms (because of cheaper rents in the town) and also to enjoy the urban status of the town. Some of the indigenes have also come back to build houses. The presence of a Zongo shows a large migrant community in the town. Some indigenes (less than 10%) have however moved out due to loss of land for farming.

2.3 Economic development - overview

With the attainment of urban status there has been a shift from farming to other occupation as trading, construction and trades like fitting, shoe making etc. Many factories and large commercial firms are located in the town and that provides work for people. There are therefore diverse occupations in the town for both men and women.

Currently, about 25% of the men are farmers with most of them farming in the nearby villages. Some also have farms in the other regions undertaking tree crop farming like cocoa. About 15% engage only in farming and the rest combine farming with other jobs such as trading, or working in the construction industry. About 15% of the farmers, do food crop farming, only 10% undertake vegetable farming. About 50% of the women also engage in farming undertaking mainly food crop farming like maize and cassava. Some also undertake vegetable farming like tomatoes and garden eggs along side food crops. More than half of the women farmers have their farms in surrounding

villages and distant regions. Some people (especially those in the Zongo) undertake livestock rearing.

2.4 Detailed analysis of farming systems

2.4.1 Farming systems categorisation

The following farming systems were identified

1. Bush fallow food-crop farms
 - maize-cassava-plantain-cocoyam-vegetable-intercrop
 2. Intensive vegetable production as sole crop
 - tomato
 3. Valley Bottom mixed farming systems
 4. Tree crops
 - oil palm
- (NO backyard farms)
5. Livestock production
 - free range small scale household production(sheep, fowls, pigs)
 - commercial poultry farming

2.4.2 Characteristics common to all farming systems

2.4.2.1 Inputs

Food crop farmers(cassava, maize, plantain) do not use fertilizers but use improved varieties of maize(Okomasa and Obatampa). Farmers said they buy a sachet of seeds of improved maize variety at 4000 Cedis. They grow local varieties of cassava.

Intensive vegetable producers use fertilizers, other agro-chemicals and improved seed varieties. They use NPK(15:15:15) and Sulphate of Ammonia. It was mentioned that other farmers do not use fertilizers because they think fertilizers are too expensive. Farmers said a mini bag of NPK and Sulphate of Ammonia are bought at 35,000 and 13,000 Cedis respectively. Karate and Dithane are used to spray vegetable farms. Some farmers said they prefer Dithane because it is more effective and gives better yield. Other farmers said they use a mixture of Karate(10,000 Cedis per tin) and Dithane(25,000 Cedis per paint container). Farmers said they buy all agro-chemicals from Kumasi.

Organic manure is used by some vegetable farmers. Those who use organic manure said it is good but fertilizer works faster and organic manure also requires a lot of watering. Farmers said organic manure is readily available in the community and its environs. They said poultry farmers dump organic manure around and farmers only have to hire labourers to cart these to their farms. The organic manure is not bought and farmers said they can obtain adequate quantities.

Farmers use a combination of hired and family labour. Farmers said hired labour is readily available

but very expensive and the rate is 4000 Cedis per day(including food). The labour is provided by local farmers who do tomato production. Majority of these farmers who are northerners sell their labour during the lean period of tomato production.

Farmers said land for farming has become very scarce in the settlement because Kumasi has caught up with it. One old woman farmer said the settlement has reached all its boundaries with neighbouring settlements and land for farming can readily be obtained from outside the settlement. She said many people cannot obtain land for farming and this has resulted in poverty. Modes for land acquisition include the use of family land(few), sharecropping, land hiring and cropping of undeveloped plots sold for building. Family lands left are mainly around valley bottoms and lower slopes.

2.4.2.2 Outputs.

Farmers said yield depend on rains. They admitted that they could not estimate yield because some of the food is consumed in the household and also because they harvest on piece meal basis. Farmers admitted that yields have generally reduced by about a third and this was attributed to reduction in soil fertility. It was also mentioned that total crop output has reduced due to the rising incidence of stealing of farm produce especially cassava and plantain. One female farmer who said she suspected local people for this behaviour attributed the situation to the to lack of jobs.

2.4.2.3 Marketing and storage

Farmers said food crops are sold both in the settlement and in Kumasi market. Maize is sold mainly in the fresh form in Kumasi. This is a major occupation for local women but some farmers, both males and females, are involved in the business. Marketing of dried maize was said to be a problem for farmers. This was attributed to the long time it takes local buyers to pay farmers for the purchase they make. The women, most of whom credit the maize, prepare kenkey and sell before they pay the farmers. Farmers said they could obtain ready cash for their maize in Kumasi but the prices offered are low and the weighing system is also is also not good. It was emphasized by farmers that they cannot find convenient place to store the maize, that is why they are confronted with these problems.

Cassava is marketed when farmers have buyers. Buyers usually buy at the farm gate and farmers sell in smaller groups in 200 and 400 Cedis worth. Last year a mini bag of cassava was sold for about 6000 Cedis. Farmers said they consume more of the cassava than they sell.

The marketing of vegetables is done directly by farmers in Kumasi to customers. Farmers complained about the price fluctuations of tomato and other vegetables.

Farmers indicated that it is only maize that is stored albeit by the traditional bam. Few people use agro-chemicals(particularly actellic) for storage. It was mentioned that most people do not store their maize but sell in the fresh form.

2.4.2.4 General constraints

Farmers ranked constraints to farming in the locality as the following:

Problem	Score
Land scarcity	5
Lack of credit	3
High cost of inputs	3
Lack of storage facilities	2
Extension services	2
Stealing of farm produce	1
Marketing	1
Bushfires	1

Most respondents complained that all the lands in the settlement have been zones as building plots and there is very little land left for farming. Farm lands are predominantly valley bottom and lower slopes but these lands are not adequate. One tomato farmer indicated that he used to crop his wife's family land but the settlement has expanded to that place and his family has lost their only farm land. He explained that originally indigenes were given some plots in areas where they had their farms if those areas were zoned for building. He lamented that this practice has been stopped by the chief and elders of the settlement with consequential land scarcity for all manner of farmers (i.e. indigenes and migrants). It was mentioned that several farmers farm on sold plots with permission from the owners of such plots but there is little security.

Farmers said they have not benefited from any credit scheme. They attributed this to the non existence of any farmers' association.

The high cost of farm inputs particularly cutlasses, hoes and agro-chemicals were mentioned. Cutlass which sells between 5000 and 6000 Cedis was thought by farmers as very exorbitant. They also said the improved maize varieties are too expensive (4000 Cedis per sachet of 1 kilo).

Lack of improved storage facilities for maize was given as the reason why many farmers sell their maize fresh even though farmers admitted that immediate cash needs also account for their selling greater part of the maize fresh. Farmers recognize that the traditional barn is not effective for storing maize especially the improved varieties. One male tomato farmer said the lack of storage facilities for tomatoes is driving many people from the occupation because they are compelled to sell their produce cheap when there is a bumper harvest without any means of storing or processing.

Farmers also complained about stealing of farm produce. They said this usually happens between the period of November and June which they referred to as the "hunger gap". Some tomato farmers also said they suffer a lot of losses to pilfering during the dry season when tomatoes and vegetables in general are scarce.

Most farmers mentioned that extension services is poor. They said they hardly see any extension officer and that has affected their adoption of improved technologies. For example one female respondent said that farmers are discouraged from using fertilizers and organic manure because they do not know how to apply them.

Marketing was seen as a problem in the context of low prices offered for farm produce, price instability (especially for tomatoes) and lack of access to market for produce directly by farmers in the local and Kumasi markets. The latter problem which farmers said has arisen as a result of the traders (especially the market queens) colluding to refuse farmers entry into the market makes it impossible to make good returns. Farmers said they strictly denied access to retail their produce in both the local and Kumasi markets.

It was mentioned that bushfires have become a problem in the settlement. Farmers indicated the fires are started mainly by hunters, and sometimes by vegetable producers (those who do dry season production). Apart from the loss of crops, farmers said the bushfires are partly responsible for the declining soil fertility in the area.

2.4.3 Management of specific farming systems

2.4.3.1 Bush fallow food-crop farms

The bush fallow food-crop farming system in the locality comprise maize-cassava-plantain-cocoyam-yam-vegetable (mainly pepper)-intercropping. Most farmers said mixed cropping in the locality comprise mainly of cassava-maize intercrop. The seasonal calendar for the intercropping system was given as:

March-April	Land clearing and preparation: most farmers use hired labour at a rate of 3000 <u>Cedis</u> per day without food.
April-May	Planting: farmers plant yam first followed by maize and cassava; cocoyam sprouts naturally and cassava is planted with hired labour; plantain is planted the same time as cassava; vegetables, particularly pepper is planted around ant hills. First weeding
June	Harvesting of fresh maize and vegetables: sales are done locally and in Kumasi. Greater amount of the maize is harvested fresh.
July-August.	Second weeding
September onwards.	Harvesting of dried maize and third weeding; the harvesting of yam, cocoyam, cassava and plantain in that order.

It was mentioned that most mixed croppers do not use fertilizers on cassava and maize. One female respondent said she knows how to apply fertilizer to vegetables but does not know how to do so with plantain, cassava and maize. Most of the farmer said they use improved varieties of maize but use local varieties of cassava. They said they do not have access to improved varieties of cassava.

Most farmers said they consume cassava more than maize and they sell little of their cassava output. Farmers complained that they cannot sell their produce in the local market because the market queens do not allow them. They also emphasized that the same thing applies in the Kumasi market.

Farmers also mentioned that most landlords are not interested in share cropping. They attributed this -to the tendency among tenants of consuming sizable proportion of the produce before sharing with

the landlord. Farmers also complained about lack of credit, high cost of input (cutlasses, hoes improved maize) and stealing of farm produce.

2.4.3.2 Intensive vegetable production as sole cropping

Farmers said that there exist extreme competition for land for tomato production in the settlement because most of the suitable land for other crop production have been sold as building plots and what is left is valley bottom and lower slopes. In addition, farmers said that there is growing interest among the youth (especially northerners) in intensive vegetable production.

Vegetable production as a sole crop is done both in the dry and wet seasons. Most farmers said they do the dry season production because of the better prices they obtain and also because the land available is valley bottom and lower slopes. Farmers who are able to do the wet season production are those who have access to undeveloped building plots. One male farmer lamented that the plot he and his wife cultivates has been sold for building and has access to no more land. He said he has decided to stop farming and look for another job.

Most of the vegetable farmers use fertilizers and other agro-chemicals (for spraying). Some said they have used organic manure before and the results were quite good except its application is more laborious than fertilizer.

Farmers indicated that they have observed that they lose a significant number of seedlings during transplanting. They said the transplanted seedling will start to grow and slowly dies off. They said this is a common problem on all tomato plots. One farmer said that the observation is common on all clayey soils. Others said they suspected some disease infestation. But they all admitted that the problem causes them to lose a lot of money. Other problems farmers mentioned were lack of credit, - lack of storage and processing facilities, stealing of farm produce, high cost of agro-chemicals and high cost of hiring knapsack (1000 Cedis per day) and motorized spraying machines (1500 Cedis per day). It is noteworthy, that farmers are skeptical about the future of tomato production due to the lack of storage and processing facilities.

Farmers said output of the crop is reducing as compared to about three years ago. They attributed this to declining soil fertility and the strange way transplanted seedling quickly dies off. Outputs are sold in Kumasi. Some farmers do "contract farming" under which traders in Kumasi advance moneys to farmers who sell their produce to them at a pre determined price. Farmers said the arrangement is disadvantageous when prices take an upturn. They, however, agreed that the arrangement offers them credit and a guaranteed price. They also indicated some of the traders are rude and demand the crop the next season if there should be crop failure.

2.4.3.3 Valley-bottom farming

It was mentioned that some farmers do mixed valley bottom farming which is mainly an intercrop of early maize and vegetables. Farmers emphasized that the price of the maize from these farms determine the price of dried maize. Surprisingly, taro and sugar cane are not grown in the settlement. One farmer said that people are more interested in vegetable production.

Farmers also mentioned some few farmers do rice production in the valley bottoms. It was indicated that these farmers are interested in buying off these lands from the owners but they are not given the opportunity.

2.4.3.4 Tree crops

The only tree cropping system identified in the settlement was oil palm farms(three farms). The farms are located at the lower slopes and fringes of the valley bottom. Most of the farms are old (an average of 20 years) and were established from local varieties. Asked why there only are few farmers doing tree cropping, the quick responses were that land for subsistence crop had even become scarce and where would they find land for tree cropping.

One farmer said the existing oil palm farms are remnants of what used to be an important activity but most of the trees have been felled and the land used for the production of food crops. The harvested fruits are sold locally and none is processed.

2.4.3.5 Livestock production

Livestock is produced both at the household (on free range) and commercial levels. At the domestic level farmers keep mainly fowls and sheep. Goat is tabooed. It was mentioned several people have flocks of sheep in the range 20 animals and above. There are others who are caretakers of sheep. This local arrangement entails that the caretaker takes sole responsibility of the flock including feeding and veterinary expenditure. The sharing arrangement is that the owner takes the first calves while the caretaker takes the following calves. The sequence goes on like that.

It was mentioned that goat rearing was banned about 10 years ago by the chief and elder the settlement because of the destructive tendencies of goats. However, farmers said that goats used to do very well in the settlement. Farmers are reported to be negotiating with the traditional authorities of the settlement to allow them to rear goats once again in the settlement.

Farmers said they feed their animals mainly on maize bran, cassava peel, fodder and open grazing under the guard of a shepherd. The major problems farmers mentioned were stealing of livestock, the high cost of drugs and the ban on the rearing of goats.

There are three commercial poultry farmers in the settlement. However, farmers indicated that there are about a dozen of poultry farms within about 5km. radius of the settlement. They said these are big time commercial poultry farmers.

It was mentioned that buyers of poultry products and livestock come mainly from Kumasi. Some individuals in the settlement also trade in the livestock business i.e. they buy to resell in Kumasi.

2.4.3 *Indicators of peri-urban characteristics*

The purchase of inputs and sale of outputs from Kumasi was given by farmers as the one of the major indicators of farmers reliance on the Kumasi market. For example, the sale of most the maize produced in the settlement in the fresh form was mentioned as being influenced by the nearness of the settlement to Kumasi. Farmer also said they purchase all their inputs from Kumasi.

Farmer also mentioned the use of undeveloped plots for building for agricultural production as another indicator of the settlement having been caught up with Kumasi. They said the scarcity of farm lands was an indicator of the settlement being engulfed by Kumasi. Some farmers mentioned the use of pipe borne water by some farmers to water their tomato farms as indicator of the closeness of the settlement to Kumasi. They also emphasized the rampant stealing of farm produce and livestock as a trait of an urban area.

2.4.5 *Farming systems constraints affected by urban pressures*

Farmers agreed that many of the farming constraints were the result of the pressures exerted by the expansion of Kumasi to the settlement. For example, land scarcity was mentioned as the direct result of the expansion of Kumasi to the settlement. Farmers said most of their farm lands have been sold as building plots and that most new farm lands are obtained from neighboring settlements. They also said the stealing of farm produce-was also due to the peri-urban nature of the settlement.

It was also emphasized by farmers that the lack of space for storage of maize was also the result of land scarcity brought about by the expansion of Kumasi to the settlement. Farmers also said that the restriction imposed by the market queens on their free entry into the local market was a constraint resulting from the peri-urban nature of the settlement.

They, however, did not think bushfires, lack of extension services, lack of credit and high cost of inputs were the result of the settlements closeness to Kumasi. Some farmers, though, recognize the high cost of labour as the result of many young men working in Kumasi.

2.4.6 *Crop-livestock interactions*

Some vegetable producers use organic manure(poultry droppings) for farming. Farmers indicated that cassava peels are mostly thrown away and that apart from the Zongo where most livestock caretakers reside, most people would ask young boys to dispose of the peels for a fee. The livestock owners are encouraged by households to collect the peel for free.

It was also mentioned that most crop residue is burnt on the farm. Very few is fed to livestock. No farmer was mentioned to have used the organic manure from sheep for farming.

2.4.7 Soil fertility status related to farming systems

Farmers' perceptions of soil fertility

Farmers use yield as the major indicator of soil fertility. They regard land left to fallow for at least four years as having its fertility restored. But it was emphasized that due to land scarcity most farmers are compelled to do continuous cropping. Farmers said the invasion of grass (*imperata spp*) also indicated fertility. One farmer said the size of the stem of a cassava stick could also be used as indicator of the soil fertility.

It was mentioned that fertility could be restored by the use of fallow management of at least between three and four years. Fertilization was also mentioned as soil fertility enhancement approach. But many farmers said fertilizers are too expensive to use. One woman respondent intimated that many people do not see that the soil fertility has declined and thus the need to take urgent restoration measures. She said she knows about the use of poultry dropping to enrich the soil and there is abundant poultry dropping in the locality but she does not apply the manure. She attributed this to the fact that she does not judge her soil as having seriously lost its fertility.

2.5 Trade and commerce

About 20% of the people (both male and female especially the youth) are traders. Some operate kiosks and deal in provisions and consumables. Others trade in Kumasi and deal in hardware and food crops. Farm produce, however, is generally sold in the town as there is ready market for food crops.

2.6 Industrial sector

There are many industries in the town. These include sawmills, chemical formulation plant, distillery and poultry farms. These provide job opportunities for some of the people. There are other small scale industrial activities like corn mills, block making factories, and carpentry shops. Some also engage in the construction sector as masons and artisanal activities like cobblers, fitters and other electrical works.

2.7 Other occupations

According to the people about 20% of the youth engage in construction works as construction site labourers for a daily wage of 3000. Sand and stone digging and loading attract a fee of 4000 for trip load. Land clearing also attract a wage of 3500 without food. Some also work in the numerous schools, banks and other offices scattered in the town as salaried workers.

Some of the women, especially the youth, engage in services like hairdressing and dress making. According to the youth, there is growing unemployment and those affected engage in lotto staking, and as casual workers in the construction industry.

2.8 Village structure and organization

2.8.1 Village structure

The village is under a divisional chief who is under the 'Kronti' Division of Asante chieftaincy hierarchy. There is a chief, and a queen mother who are all resident in the village. The Abuakwa town is made up of 4 village communities, Abuakwa, Asonomaso, Dadeeso and Buaso. Dadeeso and Buaso communities came to settle with the Abuakwa people while Asonomaso was engulfed by the urban spread of Abuakwa. All these sectors (communities) have their substantive chiefs and control over their lands. Administratively the village is under the Atwima District Assembly. There is a resident Assembly man who represents the Abuakwa town in the District Assembly at Nkawie.

2.8.2 Non governmental organisations

There is no Unit/Town Development Committee in the town. According to people, there is very low communal spirit in the town to such an extent that nobody is interested in taking any appointment relating to the development of the town. The development of the town now rests on the assembly man. There are, however, some organizations existing in the town. There is traders association, seamstresses/tailors association, hairdressers association, and sand and stone winners association. These associations comprise people who are engaged in that specific activity and cater for the welfare of the members.

There are many (about 15) religious organizations comprising men and women and they are mainly involved in church building for worship. Two political parties, NPP and NDC, seem to be active in the town. They sometimes offer communal labour.

2.9 Facilities in the village

Facilities in the town include electricity, pipe borne water, schools, toilets, health centre, private medical centres, daily market, police post, communication and financial institutions.

There is GWSC pipe in the town and people pay 20.00 per bucket of water from the public stand pipes. Some households which are not connected to pipes in the homes usually draw water from nearby houses and share the bill with them. Most houses in the new areas have wells in the compounds exclusively for the household use. There is also a stream which is used by the people especially when the pipe stop running. The stream is however found to be bilharzia infested as it is not controlled or maintained and a lot of waste from houses and open areas drain into it.

There is electricity in the town installed in the 1970's. There are 2 streams of public schools, each comprising kindergarten, primary and JSS schools. There is a third school of kindergarten and primary. There are however many (about 12) international schools, some up to JSS level in the town to cater for the numerous children from the increased population.

There is a daily market in the town with stalls. However people attend weekly market at Nkawie. Almost all goods, from food crop to clothing and bicycles can be bought in Abukwa. Most people also send their wares direct to Kumasi to sell.

All medical facilities exist in the town. There are 3 private doctors, one midwife and one public health centre. People who need special attention go to hospital in Kumasi.

Communication facilities (telephone and post office) exist in the town.

There is a pit latrine, a KV1P and 2 bucket type latrines. These are all privatised and are therefore controlled and managed by some individuals who charge ₵30.00 per visit irrespective of age. There is a refuse dump which is also under private control and management. The management also charges ₵30.00 per visit. Housing development has engulfed it and because it is a dump and no collection is done, it has grown to become environmentally unfriendly. The caretakers only sweep and gather the refuse and occasionally burn them.

Other facilities such as Police Station, banks and petrol filling stations are found in the town. There is an ongoing market complex being put up by the district assembly.

2.10 Land use

The Town serves as the gateway to Kumasi for roads from Bibiani and Sunyani.

These roads converge on the town and form about 10 metre asphalt carriage way through the town to Kumasi. The village land use itself consists of the old built up area, surrounded by the newly developing area, sawmills, poultry farms, cemetery, food crop farms and fallow lands.

There is a layout for the town and the surrounding area. The old site, including the Zongo is therefore relatively compact as against the newly built up areas where plots are spread out without access roads and in some cases with small gardens in between them. Average plot size at the new site is 30m by 25m. Currently, there are an estimated 500 numbered houses mainly in the old site, 100 newly completed and 150 uncompleted houses.

Within the old site, there is the market, police station, banks and communication facilities, schools, toilet and refuse dump, filling station and small scale corn mill sites. There are 4 commercial block making sites, 1 health centre, 2 factories, 4 sawmills and 3 poultry farms.

The developments in the new site have caused expansion in the village and are the major changes in the village in recent time. It is estimated that about 40% of the total land area of the town is taken up by housing developments; the rest being farm land and sand and stone winning sites.

Sand and stone winning sites are along the stream and in the valleys. Currently there are 3 winning sites.

Pressure on land resulting from increased population and other physical developments have reduced land sizes to such an extent that there is continuous farming on the same piece of land leading to reduced fallow period between 2 and 4 years and resulting in increased spear grass on fallow lands.

Some of the environmental problems are erosion and drainage leading to surface runoffs when it

rains and the refuse disposal problems.

2.11 Land access and management

Land originally belongs to the stool and it was the stool *which* allocated land to the families. However because each chief is autonomous, each controls and allocates land to prospective developers on their lands.

Land for housing and other development projects are allocated by the chief. Natives who need land for housing are made to pay what is termed as 'drinks' money. This drink money is substantial and except that it is much lower than what non-native will pay for the same plot of land. According to the people, a plot of land for non native range between 2 and 4 million depending upon location and how the one will negotiate with the chief, There is no fixed price for an indigenes and money paid depends on relationship with the chief. Income from the sale of plots goes to the chief. According to the chief, there is no land compensation to families for loss of land. Only the crops on the land may be paid for.

There is a layout plan covering all the lands in the town. More than half of the plots in the layout have been sold out to both locals and non natives. The result is that many farm lands have been taken over by housing and other commercial enterprises. Though housing development is on the increase, increased in-migration and return-migration by indigenes have increased rent to between ₵3,000 and ₵5,000 per month for a single room as a result of urban influence.

Like other places, local farmers have access to family lands for farming activities. As a result of developments most families are short of land and in some families, some members are landless. Members of such families consult other family heads or individuals from other families in the town or outlying villages for a piece of land to farm on based on terms.

Migrants may also get land by approaching family heads or family members.

Whether a local or migrant, the terms are the same. There is the hiring (cash rental) or share cropping. In vegetable farming, access arrangement is on cash rental only. One acre of land attracts ₵20,000 or more for a period of six months. After that if the tenant wants to use the land, he/she has to negotiate again.

On food crops, cash rental ranges from ₵30,000 to ₵50,000 for 2 years. On share cropping, only abunu share cropping exists and the tenant and land owner share crops on 1:1 basis irrespective of crop grown on the land. Few people however have access to abunu tenancy. Pattern of access to land is therefore shifting from free or share cropping to rentals and thus rendering an unfriendly atmosphere in the tenant - land owner relationship. Because land can be taken over at anytime by the chief for developers, landowners want outright sales (rental) while tenants want share cropping. With increased land shortage cash rental has even affected food crops which is not normally the case with rural areas.

2.12 Access to & management of other natural resources

Fuel wood, medicinal plants and wild growing oil palm are common property and individuals do not

need special permission for access.

There is no restriction on access to water. There is pipe borne water from Kumasi to the town and many houses are connected to it. Households that are not connected use the public stand pipe and pay C20 per bucket of water. Farming and other developments are done close to the stream. Apart from the pipe water there is a stream which is used for purposes of drinking, farming and washing. There is no control and management of the stream. Farming and other physical developments are done close to the stream. Other industrial activities like fitting shops are close to the stream thus polluting it. According to the people, the stream is infested with bilharzia as a result of the pollution.

Sand and stone winning is controlled by the chief who has absolute right over sand winning. The contractor first negotiates with the chief and then he goes to the District Assembly for a permit. Like housing plot, the land owner has no compensation for the winning of the sand. Compensation may be paid only for the crops on the land else there is no compensation of any kind of access.

2.13 Development of the village

The fast housing development and large commercial enterprises like factories are some of the major physical improvements in the town.

There are houses with better facilities and renovation of houses in the old town itself. Apart from the increased population there has been improvement in the provision of services like financial, police station and communication services. In the near future, the peoples development priorities are the upgrading of the health centre to a hospital, and movement of the existing police station to a permanent site from the present rented premises.

It must be noted however that even though the people mentioned hospital for the town, interview with the health centre administrator, shows that the current health delivery system can be upgraded to only a polyclinic. This is due to the fact that the District Capital - Nkawie, has a District Medical Officer. The District Capital is therefore qualified for a hospital. Abuakwa, which is about 1 km from Kumasi can be served by the Komfo Anokye Teaching Hospital.

2.14 Urban influence

The influence of Kumasi and the urban status of the town itself on the socio-economic life of the people are manifest in many ways. Most people engage in other occupation apart from agriculture and or travel to Kumasi every day to engage in economic activities. Vegetable farming is on the increase as most arable lands have been encroached upon and the remaining lands are valley bottom lands that are good for vegetable farming. There is economic hardship, food shortages and congestion in homes.

According to the people, many problems have resulted from the urban influence on the town. There is landlessness and food shortage, unemployment and high cost of living, dampened communal spirit, teenage pregnancy and general insecurity. However, there are opportunities for business operations like trading and employment in the construction industry and general beautification of the township.

3 Daku

Position 1°68'W, 6°63'N. The village is about 10km to the south-west of Kumasi and about 4 kilometers off the Kumasi-Obuasi road. It is in Bosumtwi-Atwima-Kwanwoma district and 30km from Kuntense, the district capital.

Participatory village map

3.1 History/origin

The village was established by the Akwamuhene (Asafo chief) during the Ashanti-Denkyira war in 1650 as a settlement for families who came to him for shelter. During the war the warriors slept over at the village and when they went they were victorious. Then chief then attributed the victory to the one-day sleeping over at the village. Thus he named it 'Dakronna' meaning 'one-day sleep'. After that many families were sent there to settle each being given an autonomous status. Now there are 9 autonomous families each controlling a portion of the land. The expansion of the village is however attributed to Nana Awere and Nana Kwasi Mpra, all divisional chiefs at the Asantehene palace.

Another version has it that the village was established by one Nana Kotwo who was a member of the Asantehene Abusua Kuruwa. He offered land to families who consulted him for land to farm. Due to an epidemic, members of the Kotwo family left to settle at other places outside the village. By that time Nana Kotwo had received 8 families. After the death of Nana Kotwo there was no descendant old to inherit him. The headship then went to the other families who had come there to settle. The occupant of the stool has since been rotating among the families in the village.

3.2 Population and livelihoods

The current population of the village is estimated at about 1500, with 735 as registered voters according to the 1996 voters register. The population is dominated by indigenes *who* form over 80% of the total. Thus less than 20% are migrants from other regions in the Southern and Northern parts of the country. There are no non-Ghanaians in the village.

The high proportion of migrants shows that the population increase is by both natural increase and migration. Since the last ten years relatively more migrants (especially those from the northern part of Ghana) have moved in to settle due to the availability of land for farming (especially vegetable farming), and also to work as farm labourers. Others have joined their spouses and other family members.

Some of the natives (especially the youth) have emigrated to bigger settlements due to the absence of basic infrastructural facilities in the village and in search of non-agricultural jobs and better social amenities. The elderly have however moved to find large tracks of land to undertake tree crop (cocoa) farming mainly in the Western region of Ghana. Yet natives who have out-migrated out number those who have in-migrated in recent times. None has moved out of the village for lack of land for agricultural purposes. This is indicative of agricultural land availability and the main reason for migrant movement into the village.

3.3 Economic development - overview

According to the elders, farming was the main occupation of their ancestors. This occupation has

continued till today. Currently, agriculture is the main source of livelihood. About 90% of the people are farmers. Cash crops such as cocoa and market crops such as oil palm used to be the dominant crops in fanning. However, due to the loss of virgin lands as a result of excessive exploitation of forest resources a new trend has emerged. Food crops and vegetable farming now dominate in the area. The remaining 10% of workers include traders, masons, carpenters, tradesmen like shoemakers and public servants, mainly teachers. Livestock rearing is also done in the village.

Almost all the elderly men are farmers with over 90% of them having farms in the village. Most of them have more than one farm land. Some do have other farms in distant regions. They undertake both cash and food crop and vegetable farming. Major crops grown by the male farmers are cocoa, oil palm, maize, yams, cassava and vegetables, mainly tomatoes. Vegetables are grown in medium and large scales.

About 80% of the male youth are farmers with about 70% of them in vegetable farming. Only about 20% do both vegetable and food crop farming. The youth prefer vegetable farming because apart from maturing early, they can get financial assistance from the customers (pre-financed) who become their sole buyers. This does not only help in their farming operations, it also help them to get ready market. The other 30% are in food crop farming. About 10 years ago only about 20% were in vegetable farming but this has increased to about 70% including those doing food crop farming as stated earlier.

Almost all the older women are in agriculture. They engage both in food crops (such as cassava, plantain, cocoyam) and vegetables (tomatoes, garden eggs, okro, chilli, onions, cucumber and especially leafy vegetables known as "AYOYO"). Though most of the food crops are consumed in the households, most of the vegetables are however sold in order to buy cloths and other basic items for themselves and their children.

Few of the young women are in farming especially food crop farming. Those who are married also undertake vegetable farming with their husbands and usually do the marketing of the produce.

3.4 Detailed analysis of farming systems

3.4.1 Farming Systems Categorisation.

The following farming systems were identified :

1. Bush fallow food-crop farms
 - maize-cassava plantain-cocoyam-vegetable-intercrop
 - maize and cassava sole cropping
2. Intensive vegetable production as sole crop
 - tomato, garden eggs, cowpea, cabbage, cucumber,

(NO Specialised valley-bottom farming)
3. Tree crops
 - oil palm and cocoa

(NO backyard farms)
4. Livestock production
 - free range small scale household production and commercial poultry farming

There is a shift in land use from cash crop production to food and vegetable production. This could be attributed to absence of virgin with spear grass also invading the secondary forests cover. This has resulted in the expansion of vegetable production which is mainly cultivated on up lands. However, there are few who have access to the valley bottom vegetable farming.

3.4.2 Characteristics common to all farming systems

3.4.2.1 Inputs

Vegetable farmers especially tomato producers were mentioned as those who use fertilizers. The fertilizers used by farmers are NPK(15:15:15) and Sulphate of Ammonia. It was emphasized that mixed crop farmers do not use fertilizers because they think fertilizers are too expensive and not economical for them to do so. For example, they said the current price of 35,000 Cedis for a 50kg of NPK is too expensive. They attributed the high price of fertilizers to the fact that farmers have to buy them from the open market in Kumasi. Farmers expected that they could obtain these inputs at cheaper rates if they were supplied by the sector ministry. It must however be mentioned that most mixed crop farmers said that they would like to use fertilizer for pepper production.

Agro-chemicals for spraying is used by all vegetable and cocoa farmers. The types used are by the vegetable farmers are Kocide, Champion, Karate and Dithane. Cocoa farmers use Unden. It was mentioned that sole maize farmers use weedicides. Farmers complained about the high cost of these inputs which they buy from Kumasi. Mist blower was specifically mentioned for its scarcity and the exorbitant price of 800,000 Cedis that farmers have to pay for them if they are able to obtain one.

Organic manure is not used by farmers in the community. Farmers said it is difficult to use organic manure because it is too bulky to carry to the farm and its application is time consuming. It was mentioned that fertilizers works faster. Farmers admitted that organic manure is equally good but they cannot obtain sufficient quantities in the locality. They said large quantities could be obtained from Kumasi but would too expensive for farmer to do this.

Most farmers said they use local varieties of crops. It was mentioned that improved varieties of maize (Okomasa and Obatampa) have recently been introduced to farmers. Vegetable farmers also use improved varieties.

The use of hired labour was mentioned as very popular in the settlement. Most farmers use hired labour particularly absentees farmers from the locality who live in Kumasi are noted for the use of hired labour for almost all farm activities. Farmer said labour rates are therefore very expensive but admitted that labour is always available. It was indicated that labour rates are determined at the beginning of every year when the national budget is read. They said these rates however do not remain fixed and can change when labour demand becomes high especially during the peak period between June and August when every farmer is seriously working on his/her farm. The current daily average rate of 3000 Cedis was considered by most farmers as too expensive.

Farm labour in the community is provided mostly by indigenous people. Farmers indicated that due to the lack of off farm income opportunities in the settlement most people especially the youth sell

their labour. It was emphasized that both male and female indigens depend on farm labour work as an important source of income. Seasonal labourers from the north of Ghana also form an important part of farm labourers.

Most farmers use family land. Sharecropping is also important in the community with cassava done as abunu while maize is abusa. Some farmers especially vegetable producers hire land for farming. Land hiring rates are negotiable and depends on the fertility of the soil. It was mentioned that most landlords who hire out their land to tomato farmers take their rent in kind. There is the other arrangement when the tenant is asked to grow cassava for the landlord after harvesting the tomatoes. This is said to be a common land tenancy arrangement for tomato production.

Farmers emphasized that land for farming has become scarce because most of the lands in the settlement have been zoned for building. Farmers who have their lands close to the settlement are said to be the most affected and farmers no longer do backyard farming. It was also mentioned that increase in the settlement's population has increased the demand for farm lands since farming is the only reliable economic activity available to the local people. They said farm sizes have therefore reduced considerable from an average of 4 to 2 acres.

3.4.2.2 Outputs

Farmers indicated that yields have reduced by about one-third compared to yields obtained 5 years ago. This was attributed to reduced soil fertility which they believe has resulted mainly from reduced fallow periods (from a minimum of seven to a maximum of 3 years presently). Some farmers also mentioned annual bushfires as a contributory factor to the loss of soil fertility in the settlement.

3.4.2.3 Marketing and storage

Kumasi is the main market for all farm produce. Local women traders buy from the farmers and sell direct to their customers in Kumasi. Some traders from Kumasi also come and buy from the farmers. Farmers said because they grow local varieties their produce has good market in Kumasi. For example, they said very little of the cassava produced in the settlement is processed or consumed locally. Almost all is sold in Kumasi. Traders buy the matured cassava farm and do the harvesting themselves. Farmers said that they like this arrangement because it gives bulk sum of money at a go but they admitted they could obtain higher incomes if they sold the crop in bits.

It was mentioned that improved varieties of maize (Obatampa and Okomasa) are sold fresh because of their comparatively higher post harvest losses during storage. Farmers also complained about the selective birds' attack of these varieties on the field when they dry. Farmers indicated that they quite happy with the steady increases in the price of food crops especially maize. They said last year they sold their maize for 35,000 Cedis but presently the price is averaging around 90,000 Cedis. However, the erratic price fluctuations in the vegetable market was deplored by most farmers.

Storage of food crops is restricted to the local varieties of maize. All other crops are sold fresh. The traditional bam is used to store maize and some farmers use chemical preservatives. Farmers mentioned that they have not received any demonstration on the use of modern cribs for storing maize. Majority of farmers dehusk the maize before storage. This is because most farmers sell the

husk which is traded in by local women in Kumasi. They are sold in fertilizer bags (mini bags) at 600 Cedis per bag.

3.4.2.4 General constraints

Farmers ranked constraints to farming in the locality as the following:

Problem	Score
Lack of irrigation	5
Lack of credit	4
Inadequate extension services	3
Reduced soil fertility	2
High cost of inputs	1
Land scarcity	0

Farmers indicated that lack of irrigation systems has constrained them from doing all year farming. Especially, the tomato farmers said they could double their outputs if they had enough water. Presently, dry season vegetable production relies on a small stream which reduces in volume during the dry season. Farmer said the stream sometimes dries up and they do not have any source of water because they are not allowed to use the community only bore hole for watering their fields. In these circumstances farmers do not produce. Most dry season vegetable farmers buy water at 1500 Cedis per barrel. The water is fetched by women and children from the local stream or from the next village.

Need for credit was expressed for the purchase of agro-chemicals and to hire labour for weeding. Farmer thought that prices of farm inputs particularly cutlass(4500 Cedis), hoe(3500 Cedis) and motorized spraying machine (800,000 Cedis) were too expensive. Farmers also deplored the lack of frequent visits by extension officers who they thought could assist them to get farm inputs at cheaper prices and also assist them to acquire irrigation facilities especially for vegetable production.

Fanners said that land was not a critical problem now but would become very critical in the foreseeable future because most of their lands are being sold for building. They said presently farmers cannot obtain large tracts of land for large scale fanning.

3.4.3 Management of specific farming systems

3.4.3.1 Bush fallow food-crop farms

Mixed cropping

This is the major farming system. The seasonal calendar for the intercropping system was given as:

Feb-March	Land clearing and preparation
March-April	Planting
April-May	First weeding.
June	Harvesting of fresh maize and vegetables
July-August	Harvesting of dried maize, second weeding
October-Nov	Third weeding, harvesting of cocoyam and some cassava(for domestic consumption).
Feb-March	Harvesting of cassava for sale

Most women farmers use hired labour for land clearing and preparation. Planting of crops follows a special order: cassava is planted first, followed by maize, yam(planted around trees), Vegetables(pepper,garden eggs, onion and tomatoes: planted on ant hills) and cocoyam in that order. Cocoyam sprouts naturally but some farmers plant some cocoyam when they are planting cassava. Most farmers plant maize *with nbooa* system. Cassava is planted with farmers own labour. It was mentioned that most farmers practise row planting.

Mixed croppers neither use fertilizers nor weedicides. They said these are too expensive. Most fanners harvest maize with hired labour(mainly women) at rate of 3000 Cedis per day. Some women are paid in kind to carry the harvested maize to the house. The main harvesting and sale of cassava is done the following year(February and March). Some farmers plant cassava on the same piece of land as they harvest the previous year's cassava. This is known locally as *Entuhye*. It was mentioned that few farmers do this and it is not a major activity.

Farmers indicated that a major problem they face is the high labour rate (3000 Cedis per day) for weeding. Normally, farmers weed three times and most farmers use hired labour. It was also mentioned that the short spell of dry season (July ending and August) causes cocoyam leaves to dry up and the corms get deeper into the soil making it extremely difficult to harvest the crop.

Sole Cropping

Maize is done as sole crop by most farmers who do mixed cropping. Farmers said that they obtain better yields of maize planted as sole crop and the system is not as laborious as mixed cropping. Farmers who do sole dropping use weedicides (particularly Atrazine) which they buy in Kumasi at 50,000 Cedis per litre. The atrazine is applied three weeks after germination. Farmers indicated that they do not use fertilizer because the atrazine fertilizes the soil.

Farmers said they use mainly improved varieties on sole crop plots(Okomasa and Obatampa) because of their superior yield quality. They admitted that a few farmers grow the local varieties because of the difficulties that they face with storing the improved varieties. Farmers said that they do not have any knowledge of storing the improved varieties which have higher post harvest losses.

Cassava as sole crop is done on tomato plots after harvesting. Farmers indicated that they make use of the ridges and the fertilizers used in the production of the tomatoes. Yields of cassava from these plots are higher and the ridges make weeding easier. Most landlords prefer a tenancy arrangement in which a tomato tenant grows cassava for them on their plots after harvesting

3.4.3.2 Intensive vegetable production as sole crop

Vegetable sole cropping is a major system in the locality. Tomato is the most important vegetable produced in the settlement. Farmers said they are interested in tomato production because it can be harvested within a short period of time and the returns are very good. Varieties grown were mentioned as Power and Italy which farmers said are improved varieties. Farmers said they buy their seed stock from Kumasi or obtain them (in fruit form) free from their neighbours. It was indicated that most farmers do seed selection from the best fruits from the parent seed stock that they purchase from Kumasi. This is repeated at every harvest. Consequently, once the parent seed is obtained farmers hardly buy another fresh seed stock. Asked whether this is a good cultural practice farmers maintained that the selected fruits are those best adapted to the local environment.

Farmers crop tomatoes four times in a year. The first cropping or *Sukane* is started in March; the second cropping or *Adantemo* is started between July and August; *Pebre*, the third crop is started in November/December; and *Petra*, the main dry season production, is started in January. It was emphasized that *Sukane* and *Adantemo* are the major seasons, that is during the rains. However, farmers mentioned that they obtain highest income from *Petra* but few farmers are able to do it because of water scarcity.

A typical seasonal calendar for the main season (*Sukane*) was given as follows:

Feb.	Land clearing and preparation:- farmers use a combination of hired and family labour, but mainly family labour; Nursing of seeds:- done one week after land preparation; Ridging/beds preparation:- most farmers use hired labour at rate of 1500 cedis per bed.
March	Transplanting:- farmers use their own labour. They said this ensures proper planting; First watering(i.e. If it does not rain):- farmer use hired labour to fetch water at 1500 cedis per barrel; Fertilization (done one week after transplanting):- farmers use NPK in a solution of 3 liters per barrel of water, and one milk tin per plant. Farmers use their own labour to ensure to effective application; Second weeding (2 weeks after transplanting):- farmers use hired labour(mostly women); Re-ridging or rebedding:- done three weeks after transplanting; Spraying:-done after re-redging and once every week till harvesting. Farmers use dithane mixed at 1.5 liters per barrel of water or karate at 10 ml. per barrel of water.
April	Second fertilization(just before flowering); Second weeding
May	Harvesting:- fanners said they do not spray when the fruits are riped; harvesting is done with hired labour normally paid in kind. The produce is carried home by women at 500 cedis per crate.

Farmers identified ridging as very laborious and tiring. High cost of agro-chemicals and spraying machines were also emphasized by farmers. For example, farmers said that the prices of motor blower (800,000 Cedis) and knapsack sprayer (500,000 Cedis) are too expensive and beyond the means of many farmers. The lack of irrigation system was also identified as one of the critical

constraints to vegetable production and tomatoes in particular.

Farmers indicated that okro, garden eggs and pepper are produced along similar production lines as tomatoes except that these crops are not produced on ridges or beds. The crops are also all sold fresh.

Cucumber and cabbages are produced mainly by women. Farmers attributed this to the low intensity of the production of these crops as compared to tomatoes. Their production, done mainly on lower slopes, is started in January and harvested in March. Farmers said they neither fertilize nor spray the crops because they do well on the local soils without fertilizers and they suffer very little attack of pests and diseases. However, farmer admitted that they use a local mixture made by mixing soot and any insecticide (especially those that kill bed bugs) in water to spray the crops against nematode attacks.

Beans, according to farmers, do well on all soils in the locality. It was mentioned that some farmers do its production in rotation with tomatoes i.e. cultivated on the tomato beds after harvesting. Farmers indicated that beans are produced by both men and women.

It is important to mention that farmers said they are very much interested in the production of tomatoes. They also emphasized that more farmers (especially the youth) are entering vegetable production than are leaving it. One young male farmer boasted that if they had irrigation facility they could produce enough tomato to meet the total demand of Kumasi.

3.4.3.3 Tree crops

Tree crop farms comprise of citrus, cocoa and oil palm farms. The citrus and cocoa farms are very old farms averaging about 25 years old. These farms were established in the outskirts of the settlement when it was a small village. Most of these farms have been replaced with food crop farms as land for food crop farming became scarce. It was mentioned that farmers are still interested in cocoa and citrus farms but there are inadequate land for tree crops farming. But the community has established a cocoa farm (5 acres) in the last 7 years.

It is of interest to mention that the community cocoa farm was established in an old cemetery which was a sacred grove. The people indicated that the farm was set up to generate income for community development. The farm has been given on abuse to some local tenants because communal labour for its management was difficult to mobilise. The major problem the farm faces was mentioned as the lack of spraying machine and the community hires that of some tomato farmers.

Oil palm plantations on the other hand are increasing in number. These farms are established on lower slopes and edges of valley bottoms which farmers claim are abundant in the settlement. Farmers said the major problems they face are constant weeding they have to do at establishment because of grass cutters attack. Some farmers said they protect young seedlings with wire mesh which they buy at 1000 Cedis from Kumasi. One farmer whose farm was visited also indicated that pests (birds and squirrels) destroy a lot of matured fruits. He also mentioned the constant threat of snakes which come to hunt squirrels.

The oil palm farmers said they use urea during the first year of cropping. They also spray against cocoons which attack the apex of trees and beetles which destroy leaves and branches. Most of the oil palm is processed locally (by traditional methods) into edible oil by women for sale in Kumasi. Traders from Kumasi also come to the settlement to buy fresh fruits which sell at 3000 Cedis per local measure (black rubber bucket).

3.4.3.4 Livestock production

Livestock are produced mainly at the household level. Almost every household keeps some fowls on free range. Several farmers also keep sheep. It was mentioned that five people in the settlement keep large flocks of sheep averaging about 30 animals. Goat is tabooed and one indigen who stays in Kumasi has started cattle production with a herd of five.

Local sanctions exist for allowing livestock to wander about without a shepherd. Owners of such animals pay 5000 Cedis per animal. This regulation is strictly enforced by the Village Development Committee. Animals that are caught are kept for three days and if the owners do not collect them they are sold and the proceeds paid into the community treasury. There is also a local livestock levy administered by the District Assembly: owners of up to 10 animals (sheep and pigs) pay 5,000 Cedis per annum, those who have between 11 and 50 animals pay 6,000 Cedis, and above 50 animals attracts 10,000 Cedis per annum. Equivalent rates for cattle are 7,000, 10,000 and 15,000 Cedis per annum respectively. For poultry, up to 1000 birds is 18,000 Cedis per annum and above 1000 birds attracts 25,000 Cedis per annum.

There are two commercial poultry farms in the settlement both of which were started about two years ago. They are deep litter systems and keep only layers with average capacities of 500 birds. It was mentioned by one poultry farm assistant that eggs sell faster. The same assistant mentioned that all inputs are obtained from Kumasi. For example, he said that they prepare their own feed but they buy all the ingredients, including maize, from Kumasi. He also said that similarly, Kumasi serves as the market for their products. But traders come to buy from them at the farm gate. He said a crate of 30 eggs sells at 3800 Cedis.

Problems mentioned were high cost of feed ingredients particularly maize, agro-chemicals, and the price instability of eggs.

3.4.4 Indicators of peri-urban characteristics

Farmers attributed the lack of access to large tracts of land for large scale farming partly to the rapidly growing peri-urban nature of the settlement. They admitted that population increase has also contributed to land fragmentation and the diminishing farm sizes (reduction from an average of 3 acres to 1 acre) but emphasised that the sale of lands or the zoning of lands close to the settlement is largely to be blamed for the situation. Farmers can only obtain large lands for farming in other neighbouring settlements.

The sale of outputs and the purchase of inputs mainly from Kumasi was given by farmers as indicators of farmers dependency on Kumasi. For example, poultry farmers in the settlement rely

solely on women traders from Kumasi who come to buy their eggs. Farmers also mentioned that some "by products" especially maize husks which did not have market is now sold to kenkey producers in Kumasi. Almost all farmers are involved in this business by either selling their maize husks directly in Kumasi or to middlemen in the settlement.

Some farmers attributed the growing number of absentee farmers in the settlement to fact that more and more farmers are seeking off-farm opportunities in Kumasi. It was indicated that some youth in the settlement have employment or learn trades in Kumasi but have farms as well. One farmer mentioned that this category of farmers create labour scarcity during peak demand periods.

3.4.5 Farming systems constraints affected by urban pressures

Apart from land scarcity farmers did not consider the other farming constraints in the settlement (see 3.4.2.4) as the direct impact of the close proximity of the settlement to Kumasi. Though farmers ranked land scarcity as the least of the fanning constraints in the settlement, they regarded it as the one that reflects the problem of the growing peri-urban nature of the settlement. Farmers recognize that it is only a matter of time and there would be very little land left for farming because greater part of the settlement would have been sold as building plots.

3.4.6 Crop-livestock interactions.

Farmers in the community do not use organic manure manure for farming. Crop-livestock interaction is mainly to do with the feeding of cassava peels to sheep. It was mentioned that not much of the cassava peels are fed to sheep because most farmers prefer to feed their livestock on pasture. Apart from maize husks which is sold in Kumasi most crop residue is left intentionally to rot on farm to improve soil fertility.

3.4.7 Soil fertility status related to farming systems

Farmers' perceptions of soil fertility

Farmers generally use yield as the principal indicator of the fertility status of soils. Length of the fallow period is also used by farmers as quick assessment of soil fertility. Farmers' perception was that a well fallowed plot should not be less than 7 years. They said soils in the community have lost their fertility as a result of shortened fallow periods which have been reduced from an average of 7 years to a maximum of 3 years. They attributed the situation to increasing pressure on land from two fronts: increasing family sizes and zoning of community lands for building. It was also mentioned that annual bushfires also account for the reduction in soil fertility.

It is of interest to mention that land hiring rates in the community are greatly influenced by the fertility status of the soil. Both landlords and tenants use the fertility status of the soil to negotiate an agreeable rate.

Farmers recognise that soil fertility in the community can be improved by increasing the period of fallow. However, farmers said this has become difficult to do due to reduction in land for farming. They said fertilizers are what some farmers are using to improve the fertility of their soils. It was mentioned that farmers are aware of the use of organic manure to improve fertility but no farmer in the community uses organic manure. One farmer indicated that this is common knowledge to all farmers in the community and that he heard about it from the radio and also from friends. This farmer said he does not use organic manure because it is not readily available in the settlement and consequently he would encounter haulage problems to bring some from Kumasi. He also said he is worried about the smell of organic manure.

3.5 Trade and commerce

Trading in the village is dominated by agricultural produce. It involves trading in food crops and vegetables and fish/meat mainly for household use. Although some traders come to the village to buy food crops, the producers, especially the vegetable producers, prefer to convey their produce to Kumasi to sell them themselves to take advantage of the high prices and also to take the opportunity to shop in Kumasi. In addition they enjoy other incentives such as cash advances from their trading counterparts in Kumasi.

Some of the traders in the village operate kiosks and deal mainly in provisions and other consummables. Some of the women commute to Kumasi to trade in food crops. Most of the young women undertake hawking in food crops and vegetables in Kumasi. There are some of them who sell cooked food. Comparatively, few of the men are traders, even though they dominate in other sectors.

Generally, the people sell their produce mainly in the village and in Kumasi. Traders from Kumasi and communities such as Santase come to trade in the village.

3.6 Industrial sector

Apart from a corn mill and the bakery which can be classified small scale there is no industrial activity in the village. Some of the active male youth engage in artisanal occupations like fitting and shoe repairing in and outside the village. They are also engage in the construction sector as masons and carpenters. The bakery is operated by the women.

3.7 Other occupations

Some of the male youth work as labourers in land clearing. Daily wage for Land clearing is C2,500 with lunch supply or 3000 when lunch is not supplied. Digging of a trip of stones (coarse aggregate) also attract a wage of 5000.

Both women and men also undertake weeding for daily wage of C2,000 with food and C2,500 without food. Some of the women undertake uprooting and head loading of cassava for a of the cassava or 1000 for two mini bags of cassava. There are about one or two professional office staff

who work in Kumasi and the Kumasi area. There are also public servants such as teachers who teach in the village. Some of the young women provide services such as hairdressing and dress making.

3.8 Village structure and organisation

3.8.1 Village structure

The village has a village chief who is under the paramouncy of the Akwamuhene at the Asantehene's palace and responsible for the traditional administration. Functionally, the chief performs executive, legislative and judicial roles. The chief is supported some elders who are sub chiefs. They are the main decision making bodies in the village and the also play adjudicative roles. The chief is not resident in the village. However, he visits the village at least once every week, and on festive occasions such as Easter or Christmas and on traditional festivities such as 'Akwasidea' or 'Fofie'. There is no queen mother in the village because there is no royal family in the village. This is due to fact that there are 9 autonomous families and the chief can be chosen from any of the 9 families.

Darko is under the Bosomtwi-Atwima-Kwanwoma District Assembly. There is an assembly man who represents the village and 4 other surrounding villages at the assembly. The assembly man is resident in the village. He is a member of the town's development committee. Though the traditional administration is not fully integrated into the district's administrative structure, it provides a viable channel for the initiation and implementation of development projects.

3.8.2 Non-governmental organisations

A number of social groups and organisations operate in the area. These groups concern themselves mainly with the welfare of their members. Notable among these are the Town Development Committees(TDC), communal work groups, religious organisations and other local groups.

The TDC comprises 6 men and 1 woman. The low number of women is reminiscent of women's aversion to community politics. The committee in consultation with the chief and elders of the village initiate development projects and programmes. The committee has been actively promoting the socio-economic development of the people. Some of the projects they have been involved in are the renovation of the public school, teak and cocoa plantation which is expected to bring in money to supplement the efforts of the people and erection of electricity poles for the electrification project of the village. They are also putting up a structure for the community bakery which is under the assistance of CEDEP and the Netherlands government.

There are Tomato growers and Bakers Associations in the village. These are made up of the tomatoes growers and bakers respectively in the village.

There are about 4 religious groups comprising men and women. Their major objective have been to uplift the spiritual status of members and to provide welfare services to members. Their main projects have been farming..

3.9 Facilities in the village

Existing facilities in the village include schools, toilets, boreholes and streams.

Only first cycle institutions which are the basis of formal education exist. There is 1 kindergarten, 1 primary school and 1 junior secondary school. The major sources of water include 1 borehole and 3 streams which has been found not to be adequate as it serves other outlying villages especially in the dry season when most streams are dried out. All the three streams yield constant flows of water.

Only one of the streams is said to have good quality water.

There is no daily market in the village and traders sell food stuffs on table tops and on the ground.

There are 4 pit latrines and a refuse dump which are maintained by children and women respectively.

For other facilities that are non-existent, the people travel to Santase and Kumasi (14km.). These facilities include hospital, weekly market and telephone. The people usually obtain most of their household items from Kumasi.

3.10 Land use

The village land use is mainly under settlement surrounded by farm lands, forest lands, streams, sacred grooves, cemetery and uncultivable areas (See village map). The built up area consists of houses, a road traversing the village, schools, churches and open spaces. There are now 50 registered houses, between 20 and 40 newly completed houses and 10 uncompleted houses. The newly developed houses are the major changes in the village. The housing expansion has resulted in the dwindling suitable lands for farming. The drainage system in the community is deplorable. As a result, run off from rains and poorly organised facilities for channeling domestic effluent is causing serious inter- house soil erosion. Many houses have eroded foundations.

The farm lands encircle the village. The constituents and quality of land is a determining factor for the type of crops grown. Due to relative pressure on land the length of fallow in the community range between 2 and 6 years. Although vegetable fanning is an important activity, farmers do not practice rotation of crops. Since the past decade the amount of land invaded by spear grass has increased and land for fanning is becoming limited. The community is endowed with sand or stone. There at the moment 6 stone winning sites in the village.

3.11 Land access and management

Land in Darko does not belongs to the stool. Land is primarily held by the 9 autonomous family heads. Thus land in the area is generally owned by the indigenes. Distribution, allocation and cultivation rights are administered by the family heads. The mode of land acquisition are mainly by family, share cropping, hiring, lease and outright purchase. Locals acquire land for farming through their families. Depending on the suitability of the soil for certain types of crops some indigenes might have to consult other families for land for farming. Those who do not get adequate land or

who for other reasons such as family litigations could not use their own family lands approach other families and negotiate on the terms.

Migrants who need land for farming will have to approach any of the family heads. Migrants who acquire family land do not own them. The same tenurial arrangement on land for farming applies to both immigrants and natives. These are mainly hiring and sharecropping. Hiring is mainly for vegetables. Prices for 1/2 an acre valley bottom land cost between ¢10,000 and 20000 for a season. Maize farm attract a rent between 5000 and 10000 for six months while food crop farm attract between 10000 and 20000. There is no sharecropping in vegetable cultivation. Cash payments and abusa are not used for food crops. In the Abunu food crop farming, the tenant may only weed the land and the divided into two for both the tenant and the landlord to cultivate his/her portion. In the Abusa the tenant pays for inputs are applied. Though vegetable cultivation is an important economic activity, farmers do not practice rotation on valley bottom vegetable farms.

Easy access to land is being threatened due to increase in demand for farming, residential and other developmental purposes. It was gathered from the field that the traditional extensive farming orientation and its resultant farm fragmentation pertains in the area.

The chief in consultation with elders, committee members and the Town and Country planning initiates the layout for the village. The chief plays the major role in allocating plots for residential, industrial and any other development project. Currently the village has a layout, however plots for residential development are now under the control of the individual family heads. The price for a plot for a stranger was yet to be determined as only locals have approached for plots. Those who acquire such lands at the moment pay only 'drink' or token fee for a plot of land.

3.12 Access to & management of other natural resources

3.12.1 Timber and non-timber forest products

The forest provides timber, fuel, food, game and medicinal plants. Men are responsible for hunting. Both men and women gather plants for medicinal use. Though access limitations has reduced reliance on certain forest products, the forest is still essential to the life and traditions of the people especially the poorer families.

Though generally forest products and other natural resources are suppose to be common property they mainly involve products that grow wild such as oil palm and herbs. In the case of logging one will have to contact the chief and the land owner for permission. With woodfuel, they are mainly gathered on individuals farms or family lands. However one could gather wood fuel from other peoples lands free but it expected that the land owner is informed. Common species include 'Okro'(Albizia zygia), 'Nyankyerene'(), 'Wawa'(Triplochiton scleroxylon). Fruit trees though are said to be common property has a clause attached in that you can only pick fruits that have dropped. Fruits plucked can be confiscated by the land owner.

3.12.2 Water

Women and girls are primarily responsible for carrying water from communal boreholes and other water sources. There are taboo days that people are not allowed to visit some of the streams. In the case of borehole, no such restrictions apply. The water sources and refuse dumps are cleaned by women every two weeks whilst the toilets are cleaned by school children. They are supervised by the village committee. In this respect the role of women as community managers becomes certified. The committee takes up maintenance of the water and sanitation facilities.

3.12.3 Sacred grove

The village like most communities observe certain days as taboo days. On such days some natural resources and or farmlands are not to be visited. In some instances you could visit the area but you are not allowed to work. Those who disregard taboo days are made to pacify with sheep. The village has a sacred grove reserved for traditional religious purposes. The grove is about 5km, it is the abode of village's idol. The 'twafohene' controls the grove. He performs or lead in sacrifices in the grove and he only has the right to go there during certain times.

Stone winning is controlled by the family head in conjunction with the land owner who have the final say though the contractor has to pay drinks to the chief. Permit however is issued by the District Assembly.

3.13 Development of the village

The community has experienced some development for the past ten years. Visible changes in Darko are new residential houses, existence of borehole, and gravelled road traversing the village. Churches are also undertaking building projects. Some of these development could be described as part of the trickling down effect from increased income from vegetable production.

The chiefs and elders enumerated the villages development priorities as provision of 2 additional bore holes, electricity, renovation of the school block, a health delivery system and a vocational school. Thus generally they want infrastructural development. The women rather mentioned electricity. They all perceived social vices such as thuggery, teenage pregnancies to be associated with any future urbanisation.

3.14 Urban influence

Proximity to Kumasi has influenced the social and economic lives of the people. The major contributing factor is the good road network, and improved transportation . At the moment people are served by about 10 taxis and trotro(local mini buses) per day. Currently, about 120 people commute to Kumasi daily. This development has *in* no small way boosted commercial activities by providing higher price incentives and ready market for their farm produce.

Observably, the link between Darko and other bigger settlements has exerted some influence on the socio-economic lives of the people. Proximity to Kumasi has boosted trading in the village. The village also relies on the cities for other basic necessities. Other changes in the village that could be attributed directly or indirectly to the link include increasing housing development. This is being done mainly by the indigenes who are in good businesses both in the village and outside. Current rents in the village per room per month is between C1,000 and C1,500.

4. Swedru

Position 1°60'W, 6°83'N. The village is in Kwabre District, about 15 km north of Kumasi, off the Kumasi - Mampong tarred highway, to which it is connected by a gravelled road.

Participatory village map

4.1 History/origin

The original inhabitants were of the Asene clan who emigrated from Amakom in Kumasi during the reign of Nana Osei Tutu, the Asantehene. They initially settled at Antoa(Kwabre) in the Ashanti Region. The original seven member group comprise 3 hunters and 4 women who apparently, were their wives. Their hunting expedition took them to settle at Akrofoso. Akrofoso was located in a thick virgin forest full of game and wild life. It appeared hunters were operating in that area during that time. The settlers of Akrofoso soon located that a few distance from their site, a large tree on which parrots converge was a settlement for a group of people from the Aduana clan who had migrated from Denkyira. The whole area must therefore had been a good hunting ground. These Aduanas and later another group of people from the Asene clan joined the original Asene group to settle at Akrofoso. Apparently for a common defence purposes for strategic reasons they all decided to move to the present site.

4.2 Population and livelihood

The current population is estimated at 1500 with 501 as registered voters according to the 1995 voters register. It is dominated by indigenous people who form more than 90% of the population. The less than 10% migrants are mostly from the North of the country with just a few from the Southern sector. This indicates that on the balance there is more in-migration than out-migration. The fact that most of the indigenous people and the migrants are farmers and /or farm labourers is indicative of agricultural land availability and farming being the main reason for the in-migration. Few have also moved in to join their spouses. Even though somebody mentioned moving in for relative peace and exposure, they do not appear strong enough reasons why he should move to settle in that village. He is married in the town and engages in agricultural activities as a secondary activity to his profession as a chain saw operator.

The natives who emigrate to cities and other fairly large settlements do so in search for non-agricultural jobs and better social amenities. None has moved due to lack of land for domestic or industrial use.

4.3 Economic development - overview

Even though hunting was the primary occupation that moved the people to settle at Swedru, over time they turned to farming to produce food for subsistence. Currently, about 75% of the men and more than 90% of the women are farmers. More than 90% of the farmers have farms in the village. The rest have farms in surrounding villages and in other regions. Major crops grown are food crops such as cassava, tomatoes, okro and maize. The remaining 25% of men and 10% of the women are involved in non agricultural activities such as trading and food processing.

4.4 Detailed analysis of farming systems

4. 4.1 Farming systems categorisation.

The farming systems described were:

1. Bush fallow food-crop farms
 - maize-cassava-plantain-cocoyam-vegetable-intercrop
 - cassava-maize-intercrop
2. Intensive vegetable production as sole crop
tomato, pepper, cabbage, carrot, cucumber
(NO valley-bottom specialised cropping)
3. Tree crop farms/ tree plantations
 - cocoa, oil palm
 - (NO backyard farming except plantains around some of the 8 new houses)
4. Free range livestock production
 - sheep, poultry

There is a shift in occupation from the original hunting and subsistence in the early eighteenth century to both cash and food crop production in the nineteenth century. Currently, due to environmental factors and pressure on land for non agricultural use agriculture has changed to food crop and vegetable production. It can be seen from farm holdings that vegetable production is emerging as a leading agricultural activity due possibly to ready market and price incentives. Some farmers combine crop farming with poultry and livestock which include sheep and pigs. Generally, livestock and poultry are reared on free range.

4.4.2 Characteristics common to all farming systems

4.4.2.1 Inputs

Mineral fertilizer is used by farmers who do intensive vegetable production as sole-crop. The types of fertilizers used are compound NPK (15-15-15) and sulphate of ammonia in limited quantities. Farmers complained about the high cost of fertilizer. Fifty kilograms NPK cost 30,000 Cedis. Most farmers cannot afford to buy fertilizer in bags but rather purchase their requirements in smaller quantities, normally in paint containers. A 5-liter paint container sells at 4000 Cedis.

Some farmers use poultry manure for vegetable production especially for cabbage and tomato cultivation. The manure is obtained from poultry farms at Bomfa and Aduman, two and three miles respectively from the settlement. Farmers collect the manure free from the poultry farms but pay 500 Cedis per maxi bag as lorry fare. The difficulty farmers associated with the use of poultry manure was its inadequate supply at the two sources of supply and the cost of transportation.

Vegetable and cocoa farmers use various types of agro-chemicals for spraying. The types commonly used are Karate, Uden, DDT(?) and Sumithion. The cocoa farmers use mainly Uden. Surprisingly, however, it was mentioned that some cocoa farmers still use DDT, a banned agro-chemical. Generally, farmers indicated that the prices of agrochemicals are too high. Farmers buy DDT at 12,000 Cedis per liter; Sumithion at 25,000 Cedis per liter and Karate at 22,000 Cedis per liter. Plantain is protected against attacks of termites by the use of a mixture of the carbon in dry cell batteries and DDT. Most farmers agreed that this locally produced mixture is very effective.

Farmers use mainly local food crop varieties. Apart from maize, all other food crops are grown from local varieties. Even with maize, many farmers still use local varieties. *Okomasa, Abeleehi and Obatampa* are the improved maize commonly used by farmers. Tree crops and sole crop vegetable farmers use mainly improved varieties. For example, the Amazonia cocoa variety used by most cocoa farmers, is obtained from the Agriculture Station at Gyamase (about 20 miles away?). Tomato and other vegetables seed varieties are obtained from Kumasi.

Most farmers use a combination of hired and family labour. Hired labour is required mainly for land clearing and preparation, seeding and weeding. Labour rates are 2500 Cedis for land clearing; 3000 Cedis for land preparation and weeding; and 2500 Cedis for seeding. All these rates exclude meals, and attract extra 500 Cedis if the farmer does not provide meals. Farmers consider the labour rates as expensive. Peak farm labour demand in the community is in January and February when farmers would be clearing and preparing their land for the beginning of the year's cropping. It was mentioned that about 80% of farmers in the settlement use hired labour to do these farm tasks.

Three major modes of land acquisition for farming exist in the community. use of family land; land hiring; and sharecropping. Majority of local people use family land while strangers usually hire land for farming. Land hiring rates average about 20,000 Cedis per acre for one year. The land hiring rate is however subject to negotiations. The *abunu* and *abusa* sharecropping systems exist in the community. Maize sharecropping is *abusa* (in favour of the tenant) while cassava and cocoyam are *abunu*. Sharecropping is not popular in the settlement due to quarrels that usually arise between tenants and landlords. These quarrels are attributed to insincerity of tenants who are often accused of eating and/or selling some of the crops before sharing with landlords. Generally, farmers believe that land for farming is not scarce.

4.4.2.2 Outputs.

Farmers found it difficult to estimate yields. They attributed this to mixed cropping which makes it difficult to quantify yields of the several crops cultivated concurrently and the piecemeal manner of harvesting. Most farmers also do not do any book keeping. With sole cropping systems farmers were able to give some estimates of crop yields. For example, they mentioned that an acre of okro farm yields about 16 local baskets, an equivalent of 8 mini bags.

Farmers, however, acknowledged that yields of all crops have reduced considerably. They attributed reduction in crop yields to reduced soil fertility resulting from shortened fallow periods. Fallow periods have been reduced from an of 4 years to 2 years. It was emphasized that the period of fallowing is dependent on available family land. Farmers who practice short fallow management obtain lower yields.

4.4.2.3 Marketing and storage

Local women traders buy the bulk of all vegetables produced in the community for sale in Kumasi. During bumper harvest traders from Accra also come to the village to buy vegetables. Cassava, plantain and cocoyam are mainly sold by farmers in the community. For example, cassava is sold in groups of 200 and 400 Cedis directly to local consumers. However, some farmers sell in larger volumes directly to customers in Kumasi or to middlemen who buy at the farm gate. The latter marketing strategy is common with the sale of cassava in which case the trader does the harvesting. Maize is marketed mainly in the dry form to local kenkey producers or to middlemen from Kumasi who usually come to buy from the community.

There is no storage facilities for cassava and vegetables. Farmers complained that the lack of storage and processing facilities compel them to sell off these crops (especially vegetables) at ridiculously low prices in times of bumper harvest. It was indicated that local farmers have heard about processing of cassava into chips which could enable them to obtain higher prices. However, there has not been the opportunity for them to benefit from this advantage.

Maize is the only crop that has elaborate storage systems. Most farmers use traditional barns with little or no use of agrochemicals for storage. They use mainly smoke to preserve the stored maize. A few farmers, however, use the improved crib storage system with actellic as the chemical for preservation. Farmers agreed that the former storage facility is cheaper but not efficient.

4.4.2.4 General constraints

At a community forum farmers ranked constraints to farming in the locality as the following:

Problem	Score
Credit(lack of)	5
Labour (high cost)	3
Pest attack	3
Farm Inputs(high cost)	3
Declining soil fertility	1
Marketing	0

Farmers said they have no access to formal credit facilities and most often resort to borrowing from neighbours. It was indicated that local interest rates are very high i.e. about 40% per month or 120% per season of three months. Some farmers attributed the lack of formal credit facility to the inability of farmers in the community to form cooperatives or credit groups.

Most farmers admitted that they could not cultivate larger farms due to the high cost of labour. They anticipated that labour rates might get higher in the near future because of the invasion of difficult weed species (spear and elephant grass).

Caterpillars, black termites and green beetles were mentioned as the most notorious pest in the locality which seasonally attack tomatoes, plantain and okro respectively. Farmers indicated that they control these pest with chemicals such as DDT, Sumithion and Karate. However, farmers

emphasized that because these agrochemicals are very expensive and they do not have access to credit facilities, majority of them are unable to apply these agrochemicals in required quantities and also at the right time.

Farmers indicated that most farm inputs are expensive. Particular mention was made of knapsack and motorized sprayers which cost 250,000 and 600,000 Cedis respectively.

Farmers complained about lack of adequate market for tomatoes especially during the bumper harvest. During such periods farmers are compelled to transport the crop to Kumasi but could hardly find buyers.

4.4.3 Management of specific farming systems –

4.4.3.1 *Bush fallow food-crop farms Maize-*

cassava plantain-cocoyam-vegetable-intercrop

The seasonal calendar for the maize-cassava plantain-cocoyam-vegetable intercropping system was given as the following:

Jan-Feb.	Land clearing and preparation
Late Feb to March	Planting
April onwards	Weeding as and when necessary till harvesting begins.
May	Harvesting of Okro
June-July	Harvesting of tomatoes
August	Harvesting of pepper, cormels of cocoyam and maize
October	Harvesting of cocoyam(matured) and cassava and other crops on piecemeal basis

It was mentioned that land clearing and preparation is done mainly by men but about 80% of all farmers use hired labor. It was emphasized that farmers are constrained by lack of credit to hire labor. Burning of plots is usually supervised by Fire Volunteers who normally do not charge any fees. There is a strict regulation for farmers who want to do early farming to ask Fire Volunteers to do the burning.

Farmers indicated that multiple cropping is difficult to do especially with the nursing of vegetables and their transplanting, and weeding under the crops because they are not grown in line. Majority of farmers who do multiple cropping produce mainly for domestic consumption. However, the vegetable are mainly sold.

Cassava-maize intercrop

This shares the same seasonal calendar and related production activities as the multiple mixed cropping described above. However, farmers indicated that in most of these farms row planting is practiced and consequently they have comparatively higher plant density. Number of weeding is also

reduced (maximum of twice) due to the canopy the crops usually form. Farmers who practice cassava-maize intercrop sell greater proportion of their produce and usually have larger farm sizes, an average of 2 acres.

4.4.3.2 Intensive sole-crop vegetable production

Tomato, pepper, garden eggs and okro are produced on intensive basis as sole crops for the market. Of these crops tomato is the most important. One farmer said he tried to produce carrots and cucumber but was not successful. He said that the seeds he nursed on his farm never germinated and suspected that the seeds had expired but was not sure. The same farmer said he has been successful in producing cabbage for the past three years.

Both wet season and dry season vegetable production are practiced by farmers. However, majority of farmers do wet season vegetable production because of difficulties that farmers said they have to go through watering their fields in the dry season. Vegetable production as sole crop is done mainly on valley bottom and lower slopes. The valley bottoms are used in the dry season. It was mentioned that during the peak period land in the valley bottoms become scarce and usually attract hiring rates higher than the local average of 20,000 Cedis per acre. However, farmers indicated that dry season vegetable production is more, profitable than the wet season production.

The seasonal calendar for sole crop dry season vegetable production was described as the following:

Early Jan.	Land preparation; first ridging; watering of ridges (twice a day for two weeks)
Mid Jan.	Nursing of seeds
End of Jan	Transplanting and watering
Mid of Feb.	First fertilization and watering
End of Feb.	Second ridging; first spraying; watering
Early Mar.	Second spraying; and subsequent spraying every seven days for three times; watering
March ending	Harvesting

Water is obtained from a perennial source in the valley bottom but it was mentioned that the stream reduces in volume and farmers sometimes are compelled to dig their own wells. Problems associated with sole vegetable production were mentioned as:

- labour intensive: however, farmers admitted that vegetable production is more profitable than cassava-maize mixed crop farming
- pest attacks: farmers indicated that the adulteration of agro-chemicals reduces their efficacy and causes the overuse of agro-chemicals.
lack of market during bumper harvest
- lack of credit to crop large acreages: average farm sizes were indicated as quarter of an acre.

4.4.3.3 Tree crops

Cocoa and oil palm are the tree crops farming systems in the locality. Cocoa farmers number about thirty. The largest cocoa farm in the settlement is about 5 acres. Most established cocoa farms are very old(between 20 and 35 years). Many new farms are being established with improved varieties especially the Amazonia variety. Farmers mentioned the prevailing higher producer price of cocoa as the major incentive. It was indicated that most farmers do not want to convert their old cocoa farms to food crop farms because of the fear of invasive species and the subsequent loss of soil fertility. This group of farmers are rehabilitating their old farms.

The major problems which farmers mentioned as facing cocoa farmers were: high cost of insecticides; late delivery of insecticides; scarcity and high cost of spraying machines; low yields of crops due to the high incidence of the black pod disease; and the constant fear of losing farm through bush fires.

Seasonal activity calendar for cocoa farming was indicated as: November to April, nursery activities; June to July, transplanting; weeding, done as and when it becomes necessary; and August to November, spraying. Farmers said that ideally spraying should be done four times in a year but due to the high cost of insecticides they are able to spray only twice.

There are 6 oil palm farmers in the community. The largest farm was said to be about four acres. All the farms have been established within the last six years. It was mentioned that there is a growing interest among farmers in the establishment of oil palm farms. One of the oil palm farmers who also has a cocoa farm indicated that oil palm production is better than cocoa because the improved varieties of oil palm are able to withstand bushfires. He emphasized that the growing incidence of bushfires in the settlement makes cocoa production a high risk venture because of its high investment, long gestation period and the longer period it takes to recoup investment.

All the oil palm farmers use improve varieties which they buy from Kumasi. Land earmarked for oil palm production is initially planted with cassava in the first six months before the seedlings of the oil palm are transplanted. The farmers indicated this allows the cassava to take better rooting. Farmers expressed concern that they could not intercrop cassava with oil palm after the first year of establishing the oil palm.

Farmers mentioned their major oil palm production problems as pest attacks and the die back of the apex. It was also mentioned that they cannot intercrop oil palm with food crops for a longer period as it is done with cocoa.

4.4.3.4 Livestock Production

There is no large scale poultry farm in the settlement. Asked why there are no large scale poultry farms in the settlement, the chief of the village responded that he would not give large tracts of land for poultry farming. He said poultry farmers take large tracts of land (not all of which they use for poultry farming) and bring about problems in land distribution.

Livestock production is mainly done on free range and almost every household keep some livestock. The animals kept are fowls and sheep. Goat is tabooed. Sheep are supposed to be penned and guarded to graze in the evenings. Sanctions exist for stray animals which destroy farm crops (the farmer has

to be paid for destruction caused by the animals) and are enforced by the Village Development Committee. It was mentioned that the sanctions are not strictly enforced because almost every household keeps some sheep.

Stealing of livestock was mentioned as the production constraint. This has discouraged many farmers from increasing their stock. Disease attacks especially Newcastle and Coccidiosis in poultry, and skin diseases in sheep were said to be prevalent in the settlement. Lack of credit to buy starter stock and pay caretaker's remuneration were also mentioned. There is also the perception among farmers in the settlement that livestock spread weeds through their droppings.

4.4.4 Indicators of peri-urban characteristics

Peri-urban characteristics in farming in the locality include:

Kumasi serving as the direct and major source of supply of inputs and sale of outputs. Most farm inputs are purchased direct from the Kumasi market and outputs sold in the same market. Stealing of livestock. Farmer perception was that these organized night raids of livestock might originate from Kumasi and or are instigated by the ready market for livestock especially by Chop Bar operators in Kumasi.

4.4.5 Farming systems constraints affected by urban pressures

Farmers did not attribute the major farming constraints(see 4.4.2.4) in the settlement as resulting from its closeness to Kumasi. Most farmers said they did not see Kumasi exerting any pressures on the farming systems in the settlement. The only indications was farmers' speculations that the rampant stealing of sheep in the village might be done by people from Kumasi or induced by the ready market in Kumasi.

4.4.6 Crop-livestock interactions.

Most farmers in the settlement are aware of the use livestock manure for farming. It was mentioned that some farmers use poultry dropping for vegetable production especially for cabbage and tomato production. Farmers said they have little access to poultry droppings. Crop residues (e.g. cassava leaves and peels) are fed to sheep.

4.4.7 Soil fertility status related to farming systems

Farmers' perceptions of soil fertility

Farmers mentioned local indicators of loss of soil fertility as:

- poor/stunted growth of crops
- reduced size of tubers and cormels of cocoyam
- emergence of grass(especially *imperata* spp)

- when soils become clayey.

Loss of soil fertility in the locality was attributed to the following:

- deforestation: farmers mentioned especially the loss of Cola gigantla trees the leaves of which were said to add tremendous amount of nutrients to the soils
- lack of crop rotation: farmers acknowledged that cropping the same piece of land with the same crops mined the land of its nutrients.
- cultivation of citronella. It was emphasized by farmers that the introduction of the grass in the locality, though few farmers do it, was a potential threat to the fertility of their soils.

Most farmers acknowledged that fertility of soils could be restored through long fallow periods(4 years), use of fertilizers and organic manure especially poultry droppings. Some farmers also mentioned that Chromoleana odorata could restore fertility.

4.5 Trade and commerce

Trading in the area is dominated by agricultural produce. It involves trading in crops such as plantain and vegetables. Commercial and trading activities are mainly localised.

There are few immutable traders in the village, who operate kiosks and deal mainly in provisions and other consumables. Few of the women are food processors (cassava, dried pepper and palm oil) and cooked food sellers. Comparatively, few of the men are traders, even though they dominate in other sectors.

4.6 Industrial sector

Industrial activities in the area can be classified only as 'informal. It comprises mainly of small scale activities. Some of the youth and active male youth engage in artisanal occupations like fitting and shoe repairing in and outside the village. They are also engage in the construction sector as masons and carpenters in and outside the village. There exist small scale food processors who are mainly women.

4.7 Other occupations

The young and active population also undertakes other jobs such as land clearing for wages, and sand and stone digging and loading for fees. Daily wage for land clearing is ₦2,500 with lunch supply. A farmer however pays ₦3,000 if he is not able to supply lunch for the labourer. Digging and loading of a trip of coarse aggregate(stones) pays ₦12,000.00 (₦8,000 for digging and ₦4,000 for loading). The equivalent rate for smooth aggregate (sand) pays ₦4,000 per single trip. Minor occupations for the women include hawking, head loading (conveying of farm items from farm gates to the village. Charges range between ₦1,500 and ₦2,500 for 1.6 km depending on the crop type). The women especially the youth also engages in weeding for a daily wage of ₦2,000. Non- agricultural occupations undertaken by

the women include hairdressing, gari processing, palm oil processing and selling of cooked foods. Few of the women are office workers who commute daily to their places of work. The rest of the men are in such trades as fitting, shoemaking and construction. They work mainly in Kumasi and commute daily. There are few public servants comprising teachers.

4.8 Village structure and organisation

4.8.1 Village structure

The village is under a divisional chief who is directly under the 'Kronti' division of Asante chieftaincy hierarchy. The village does not have a substantive queen mother. However there are 2 elderly women who have been appointed by the chief to be responsible for all matters directly concerning women. These women have no special traditional or legal authority. Their role is therefore purely advisory.

The chief is supported in his court by five sub chiefs each of whom represent a clan in the village, and some leaders who are either family heads or their representatives. They play both deliberative and adjudicative roles.

Administratively, the village is under the Kwabere District Assembly (DA). There is an assembly man who represents the community and a couple of other communities in the DA which sits at Mampong, the district capital. Though the traditional administration is not fully integrated into the district's administrative structure, it provides a viable channel for the initiation and implementation of development projects.

4.8.2 Non governmental organisations

There are various organisations in the village. Notable among them are the Town Development Committee(TDC), Traders associations, Religious Organisations, Political Parties, Labour groups 'Nnobia'.

The TDC consists of 4 men and 3 women. They are supposed to initiate development programmes and projects in consultation with the assembly man, Chief and elders of the village. However, there were complaints that the committee is not active, The female members inspite of their numerous productive, reproductive and community management roles were said to perform better in the committees activities. To speed up development, committees have been set up for specific projects such as electrification project, toilet and water committees.

The planning and development management responsibilities of the TDC and the Assembly man are specified under the local government regulation. On the other hand the deliberative and adjudicative duties of the chief and elders are conditioned by traditional norms. Therefore the village structure

cannot be seen to be directly or indirectly influenced by urban contacts.

The traders associations comprise women's marketing groups who at times undertake group farms and sell produce for members welfare. There are 5 religious organisations made up of men and women. The church organisations do not have funds to undertake any development activities for the community. There is a traditional music group comprising old and young women. They play music during occasions such as Christmas, Easter and on other festive days.

4.9 Facilities in the village

Facilities in the community include boreholes, streams, toilets and schools.

There are 3 boreholes one of which is not in use. The rest are plagued with frequent break downs. Residents who are above 18 years or have completed JSS and above are considered adults. They pay ₦1,200.00 per year for the use of the boreholes. The levy is used for maintenance. It is also possible that the amount is levied to enable each adult feel responsible for the control and maintenance of the facility.

There are five streams encircling the village. However, four are seasonal and dry out in the dry season. This must have created the situation where almost every body uses the only perennial for all domestic purposes other than drinking. Before the boreholes were drilled for the community the whole village depended mostly on that stream.

There is a stream of schools comprising 1 Kindergarten, 1 primary and 1 JSS all located in one compound. There is no market in the village retailers use tables and street side kiosks for selling their wares. The pit latrine has two separate apartments for men and women. School children are responsible for the cleaning up its surroundings every week.

For other facilities such as health, communication - telephone and post office the residents have to travel to other settlements such as Aboabugya, Aboaso, Mamponteng and Kumasi.

The development of urban areas close to the village has enabled the people to get access to facilities listed above. Whereas the settlement is independent of larger settlements in terms of such facilities as water and sanitation, and primary education, it relies to a large extent on the fairly large settlements for other facilities like telephone and postal services. This relationship is facilitated by the good access road.

On-going projects being undertaken by the community include the construction of a JSS Workshop being sponsored with the District Assembly common fund to which the people are providing labour and some local materials as part of their contribution. Through communal labour and monetary contributions of ₦400.00 per adult they are also constructing 2 K-VIP Toilets.

4.10 Land use

The village land use consist of the built up area surrounded by farm lands, fallow lands, a cemetery

and a grove.(See village map). The built up area consist of houses, schools, churches, a main road traversing the village and open spaces. Currently there are 59 numbered houses, 15 unnumbered and 8 uncompleted houses. The new and uncompleted houses are the major changes in the village in recent times. They are the result of expansion in the village to meet demand for accommodation. Increasing housing construction has encroached on lands suitable for food crops. Within the newly built area, back yard gardens (mainly plantain) are found around houses. Erosion is not a problem in the village. However, recently they are experiencing flooding due to a road construction project which has blocked the flow of a stream.

The farm lands comprise cash and food crops and vegetables. Vegetable farms are mainly along the streams. Fallow lands are left for periods ranging between 3 and 8 years. Invasion of spear grass has now increased due to the slash and bum farming methods.

Sand and stone winning sites are along the streams. Currently there are 2 sites. This activity competes with vegetable farmnig for suitable lands.

4.11 Land access and management

Land originally, belongs to the stool and it was the occupant of the stool who allocated the lands among the families. However a portion of land was kept for the stool. This piece of land became the property of the occupant of the stool at any time. It could therefore not be appropriated by anybody or bequeathed to off springs as inheritance. There are 5 main family lands managed by their family heads.

Land for housing and community development projects is allocated by the chief. Local farmers have access to family lands for farming activities. In other families those who do not get access to adequate land on their family lands consult other family heads or individuals from other families with adequate family land, for a piece of land to farm on.

Some natives are however short of land probably due to population increase or due to the absence of a family member from the village for long years. It could also be due to the allocation of their lands for housing or community projects. Families or individuals whose lands are used for housing and other community development projects, according to the chiefs acid elders get a third of the total income and two-thirds go to the stool and the village development committee.

There are different types of arrangement that accompany this lease namely hiring and share cropping. Share cropping arrangement are of the 'Abunu' or 'Abusa' types where the crops are shared on 2:1 and 1:1 respectively.

Natives who need land for housing are made to pay what is termed as 'drinks'. This drink can be quite substantial except that it is much lower than what a non-native will pay for a plot of land.

Migrants may get land by approaching family heads or family members and negotiate on the terms. They can consult the chief if they are not successful with the heads of families. The tenurial arrangements, when they are successful are on cash rentals and share cropping bases. Cash rental is mainly for vegetables. There is no fix charge, however, prices for an acre of land range between ₦10,000 and ₦40,000 for six months. Share cropping are for food crops. Abusa is used for maize

where two-thirds of the produce goes to the tenant and one-third to the land owner. Other food crops e.g. cocoyam, plantain, cassava are shared on abunu, that is 50/50 basis. Migrants who use the stool land do not own them. The lands reverse to the chief when they become vacant or when the tenants leave the village.

Access to land is not the same as in the past 20 years. Increased population has reduced the land sizes available. There is shift from cash to food crop and currently the emerging trend is towards the hiring of land for vegetable cultivation. In Swedru the relationship between demand and supply of land is not competitive.

The initial layout plan for the village was drawn without contours and was therefore suspended. A new one is being prepared by the regional Town and Country Planning Department. Currently, those who need land for development has to inform the chief who has the right to allocate land for developments. Prior to this prospective housing developers contacted village committee members. The chief apparently took over when he detected some dishonesty on the part of some of the committee members.

4.12 Access to & management of other natural resources

4.12.1 Timber and non-timber forest products

In the case of tree felling it is not allowed to fell trees within the range of 50 feet from the river. Beyond that one will have to seek the permission from the land owner and pay drinks to the owner and the chief. Sundays and other traditional religious days e.g. Akwasidae are taboo days and people are not allowed to visit the river.

The forest provides firewood, timber, food, wildlife and plants. With the exception of timber, all forest products e.g. fuel wood, wild palm trees and medicinal plants are common property and individuals do not need special permission to have access to them. It is however deemed right to inform the land owner. Common wild trees used for fuel as enumerated by the women are `wawa'(Triplochiton scleroxylon), `onyina'(Ceiba pentandra), `pepea'(Margaritaria discidea), `Krokroma, `Okro'(Albizia zygia), nyankyerene' and dead cocoa trees. Hunting in the forest is allowed however, from August to October it is prohibited by a government policy with the view to protecting expectant animals. It was gathered that when there is a big game the hunter is expected to send a thigh to the chief.

With regard to land and forest resources the old people have much control in that they are already in possession of the resources thus the youth have to seek permission from them for usufructuary rights. There was however no impression that anyone has lost out.

Even though forest products and other natural resources are generally supposed to be common property they mainly involve products that grow wild such as oil palm and herbs. In the case of logging one will have to contact the chief and the land owner for permission. With firewood, they are mainly gathered on individuals farms or family lands. However one could gather firewood from other

peoples lands free but it is expected that the land owner is informed for courtesy. Common tree species include `Okro'(Albizia zygia), `Nyankyerene'(), `Wawa'(Triplochiton scleroxylon). Fruit trees though are said to be common property but you can only pick fruits that have dropped. Fruits plucked can be confiscated by the land owner.

4.12.2 Water

There is no restriction on access to water. 25 yards along the river is prohibited for sand and stone winning and farmuig to preserve the vegetation and the flow of water. Fetching of water is the primary responsibility of women and children. During taboo days people are not to visit certain water sources. The TDC is responsible for controlling the water sources in terms of maintenance and rate collection. On the other hand it is the women who do the scrubbing of the borehole stands and clearing the weeds at the banks of the river. This could be understood from the perspective of women being the primary users of water and therefore the managers of community water resources. They also manage the community refuse dump.

4.12.3 Sacred grove

The village has a sacred grove which is reserved for traditional religious purposes. People are not to visit it on Mondays. The reserve is managed by the chief and an appointed traditionalist. People who disregard the taboos are made to sacrifice sheep

4.12.4 Sand and stone

Currently, sand and stone winning is done by outsiders. They must be contractors with permits from the District Administration to win sand and stone. Their first contact is the land owner for negotiations and then inform the chief and pay `drinks' to the chief. Usually, the contractors employ the male youth as labourers for digging and loading of sand

4.13 Development of the village

Over the past decade, major changes that have occurred in the village include expansion in housing. This is being done by mainly the indigeneous people who are in good businesses in the village as well as from those who have emigrated to cities or are outside the country. However few strangers have acquired plots for development. Currently sale of plots for development has been suspended, awaiting a layout from the Regional Town and Country Planning Department.

Visible improvement in the village for the past 10 years include new housing development, houses with better facilities and improved road network and transportation. In the next ten years the peoples' development priorities are a health delivery centre, police station and factories to employ both skill and unskilled labour.

Women enumerated their project priorities as electricity, water and proper toilet facilities. Generally, they all envisaged associated social vices such as juvenile delinquency, teenage pregnancy, dampened communal spirit and high rate of landlessness with the increasing housing development.

4.14 Urban influence

The influence of Kumasi on the socio-economic life of the people in the village is facilitated by improvement in the road network and transportation. Currently about 3 passenger buses commonly called 'troto' ply the route between Kumasi and the village Altogether they make 12 trips a day conveying around 100 people to and from Kumasi to undertake their economic activities and for shopping. This easy access to Kumasi appears to have influenced the change in agricultural land use in favour of increased vegetable production. Vegetables have a large and buoyant market in Kumasi. It was observed and later confirmed through interviews that the vegetable farmers do not have to take their produce to Kumasi. Traders from Kumasi and the other suburbs of Kumasi travel to the village most often to farm gates to buy such vegetables as tomatoes, okro, chilli and gardeneggs.

However few farmers especially the women, take their produce to Kumasi themselves as against selling them at the faun gates to women traders. Perhaps they take advantage of their need for shopping in Kumasi to also go and sell their produce. Of course one can not rule out a motivation for higher price.

5. Nyameani

Position 1°47' W, 6°73' N. The village about 30km southeast of Kumasi and 8km from Kuntense, the district capital. The village lands extend in a narrow band to the shore of Lake Bosomtwi but for the most part are outside the crater.

Participatory village map

5.1 History/origin

Nyameani was first settled by people from Abrenkese. According to history, a hunter of the Abrenkese chief during a hunting expedition got to the area and realised it was endowed with vast rich lands. The hunter was quite impressed and went to inform the chief of his intention to settle there. He was later joined by others from Abrenkese. Since then the two villages have had close ties to the extent that they both have one chief. According to history the Ashanti kingdom(Asanteman) was established during the reign of Nana Osei Tutu *who* was the son of the chief of Abrenkese. It is therefore concluded that Nyameani existed before Asanteman - i.e. before 1800.

5.2 Population and livelihood

The population of the village is estimated at about 3,000. Eight hundred and sixty eight (868) are registered voters according to the 1995 voters register. The population is dominated by indigenous people who form over 90% of the total. Thus less than 10% are migrants from other regions in the Southern and Northern parts of the country. There are few non-Ghanaians *who* have been so acculturated to the Ghanaian way of life that their identities might not be easily recognized. An interviewee who is married to and has children with a local person initially claimed to have come from the Brong Ahafo region but it was later found out that he is from Burkina Faso.

Since the last ten years relatively more migrants have moved in to settle due to the availability of land for farming, and also to work as farm labourers. Others have joined their spouses and other family members. Some have also moved in due to availability of social amenities such as schools, a clinic etc.

Some of the natives have emigrated to bigger settlements due to the absence of basic infrastructural facilities in the village and in search of non-agricultural jobs and better social amenities. Most of the youthful population have moved outside to further their education since there is no secondary institution in the area. They lodge with relatives and friends in the cities. With the boom in rice production some natives have also moved into the village to cash in . Yet natives who have out-migrated out number those who have in-migrated in recent times. None has moved out of the village for lack of land for agricultural purposes.

5.3 Economic development - overview

Although the original inhabitants were hunters, with time they got into farming, apparently, to meet food and other requirements. Currently, agriculture is the main source of livelihood. Approximately, 90% of the people are farmers. Cash crops such as cocoa and market crops such as oil palm used to be the dominant crops in fanning. However, due to the loss of virgin lands as a result of excessive exploitation of forest resources, a new trend has emerged. Food crops now dominate in the area. Fruit trees e.g. citrus and wood lots exist in the village. The remaining 8% of workers include traders, public servants, mainly nurses and teachers. Some operate in small scale food processing e.g. fish processing and grain milling. Over 90% of farmers have farms in the village. Most of them

have more than one farm land. Some do have other farms in distant regions. Major crops grown by the male farmers are rice, oil palm, maize, yams and vegetables, mainly tomatoes. Vegetables are grown on medium and large scales.

Women play an integral role in agriculture. Many of them function as independent farmers as well as family-farm labourers and are in many cases involved in market crops. The women engage mainly in food crops such as cassava, plantain, cocoyam and vegetables- garden eggs, okra, chilli, onions, cucumber and leafy vegetables like 'Kontomire'. Though the women gather most of the food products consumed in the households, they also sell some of the products in order to buy cloths and other basic items for themselves and their children. They also buy food and condiment they cannot produce themselves.

5.4 Detailed analysis of farming systems

5.4.1 Farming systems categorisation

Food crop production is the main agricultural activity. A wide range of crops are cultivated in the locality. The major crops grown in the increasing order of importance are: cocoa, rice, yam and plantain. Local people base this ordering or ranking on the income derived from the crop and the number of people cultivating the crop.

The farming systems described were:

1. Bush fallow food-crop farms
 - maize-cassava-plantain-cocoyam-vegetable-intercrop
 - maize or yam or rice as sole crop
2. Intensive vegetable production as sole crop
 - tomato, pepper, garden eggs, okro, onion(NO valley-bottom specialised cropping)
3. Tree crop farms/ tree plantations -
 - cocoa, oil palm, citrus, teak.
4. Backyard Garden
 - plantain
5. Livestock(mainly as free range)
 - goats, sheep, poultry, piggery.

There is a shift in land use from cash crop production (i.e. cocoa) to food and vegetable production. This could be attributed to scarcity of virgin and secondary forests, and the loss of land to other non agricultural uses. The loss of vegetative cover has left plain lands in its trail. This has resulted in the expansion of rice production which is mainly cultivated on plain lands. Rice cultivation in the area is mainly in the upland. However, there are few who have access to the valley bottom for rice production. The inclination towards rice and vegetable production is due to the fact that, comparatively, they generate more income.

5.4.2 Characteristics common to all farming systems

5.4.2.1 Inputs

The use of mineral fertilizer is restricted mainly to vegetable production particularly tomato. The types of fertilizers used are compound NPK (15-15-15) and sulphate of ammonia in limited quantities. Fifty kilograms NPK cost 34,000 Cedis. Only one person uses poultry manure for the cultivation of tomatoes. The limited usage of poultry manure, according to the farmers, is due to lack of knowledge on manure management.

Agro-chemicals for spraying are used mainly for tomato production. The types used are Kocide, Dithane, Karate, Topsin and Sampi (liquid foliar fertilizer). The few farmers who spray their cocoa farms use Uden. These agro-chemicals are also bought from the open market from Kumasi.

Apart from maize, vegetables and cocoa, all other crops are grown from local varieties. The major improved maize varieties used are *Okomasa*, *Abelehi* and *Obatampa*. Hybrid cocoa is used for the establishment of all new cocoa farms.

Most farmers use a combination of hired and family labour. At the current rate of 3000 Cedis per day without food or 2500 Cedis with food, farmers consider labour as expensive. Peak labour demand is in May to August, the season for rice production.

Most farmers use family land for farming. However, a substantial number of the farming population, about 20%, are tenant farmers majority of whom are migrant farmers. Generally, most farmers do not consider land as scarce although they view the rent for land as very expensive. For example, farmers who hire land for rice production, pay in kind, on the average about 2 maxi bags of rice(milled), an equivalent of 180,000 Cedis. Land for vegetable production is hired at an average rate of 36,000 Cedis per season. It must be emphasised that these prices are negotiable and are not based on hectareage.

Two types of share cropping, *Abunu* and *Abusa* are practiced in the community. *Abunu* is available for the production of plantain, cocoa and oil palm while *Abusa* is practiced for the production of maize and cocoa. Under the *Abunu* system, the tenant bears all the production cost and receives 50% of the produce. The *Abusa* is applied differently to food and tree crops. Usually, for maize, the tenant provides all the labour and other inputs and takes two-thirds of the total output. With cocoa, tenants act as caretakers of established farms and provide all the required labour input and receive a third of the output.

5.4.2.2 Outputs.

With no record keeping farmers found it very difficult to give yield estimates of crops grown. However, farmers have observed decrease in crop yields. Reasons given for decline in crop yields include: low fertility of soil due to tree felling and bush fires; high disease incidence on cocoa and onions with little or no agro-chemicals for control; and forest land turning into grassland. Yield of the major crops in descending order of importance was given as rice, maize, cassava, cocoyam, yam, cocoa and plantain.

5.4.2.3 Marketing and storage

Marketing strategies vary with the type of crop. Rice, vegetables, plantain and yam are mainly sold directly by farmers in Kumasi to established customers. Maize is marketed mainly in the dry form either to local poultry farmers or to middlemen who usually come to buy from the community.

Orange and cassava are sold locally to middlemen. Generally perishable crops attract low prices due to the lack of processing and storage facilities systems. Maize is often stored in traditional barn and sold in the lean season when prices are high. A few farmers, however, use the improved crib storage system with actellic as the chemical for preservation.

5.4.2.4 General constraints

Constraints to farming in the locality analyzed in a problem matrix at a community forum with farmers revealed the following results:

Problem	Score
Credit(lack of)	5
High cost of Inputs(cutlasses, hoes, agrochemicals, etc.)	4
Disease/pest incidence	3
Lack of Agricultural Extension Services	2
Marketing	1
High cost of land(hiring)	0

Credit, the most important constraining factor in farming in the community, is required mainly for hiring labour for weeding. Farmers attributed the high cost of inputs which are mostly purchased from the open market to the removal of subsidies and the apparent corrupt practices which deprive farmers from obtaining these inputs from government approved sources.

Farmers complained about lack of adequate market for cassava. It was also indicated that land hiring has become very expensive especially for rice cultivation.

5.4.3 Management of specific farming systems

5.4.3.1 Bush fallow food-crop farms

The bush fallow food-crop farms are of two types: sole and intercrop farms. There exist the maize-cassava-plantain-cocoyam-vegetable-intercrop and the maize, yam and rice sole crop farms.

Mixed cropping

In the mixed cropping system maize is planted first and then followed by cocoyam, cassava, plantain and vegetables in that sequential order. Vegetables are usually grown on ant hills where farmers indicated has relatively better fertility status than other parts of their fields. On these farms, farmers do not use fertilizer or organic manure. However, weedicides are commonly used for weed

control. It must be mentioned that majority of farmers in the community practise this system of farming.

The seasonal calendar for this cropping system was given as:

February	land clearance
March	Burning
April	Sequential planting of crops when farmers consider rains as adequate.
May	First weeding
June-July	Second weeding
August	Harvesting of maize
September	Third weeding
February	Harvesting of all other crops begin but on piecemeal basis

Sole cropping

Sole-food cropping was mentioned as a recent development in the community's farming systems. Farmers indicated that the system has arisen as a result of landlords desire to free their lands for hiring on short term basis. Majority of farmers who practice sole cropping are young males. The high and quick returns were mentioned as the principal factors which entice young males to go into sole cropping. On the other hand, farmers mentioned the risk involved (loss of diversity of crops farmed and possible crop failure) as well as the labour and capital intensiveness of sole cropping as the reasons why most farmers in the community do not practice sole cropping.

Rice

Rice as a sole food crop was indicated as the most unportant crop cultivated in the community. It is cultivated mainly as an upland crop and does well on all the soils in the settlement except on the summits. Rice cultivation was, however, mentioned as the most labour and capital intensive system. Returns from rice production was acknowledged as the highest in the community. Farmers use local varieties (white and brown). Apart from weeding where farmers use weedicides (mainly Mazagram, sold at 90,000 Cedis per bag, last year) all other activities are done manually.

Seasonal calendar for rice production spans from February (land clearing/preparation), March(seeding, weeding), April-May(weeding) to June(bird scaring, harvesting and marketing). Bird scaring is usually given on contract to children. They charge between 15,000 and 30,000 Cedis per field. Harvesting is done by local women and women from surrounding settlements who are paid in kind i.e. for every 10 bunches harvested the harvester takes two. Threshing is also done by local boys(especially school boys) who are paid 1800 Cedis per maxi bag of paddy. Bird scaring, high cost of weedicides and wellington boots, and the exploitative tendencies of land hiring were mentioned as the major problems in rice production.

Land hiring for rice production was particularly singled out as the most important constraint. Unlike land hiring for other crops where tenants pay a negotiated rent, rice farmers are obliged to pay their rent in kind (not considered by farmers as share cropping). Farmers pay on the average 2 bags of milled rice, an equivalent of about 180,000 Cedis per season. This is considered by many farmers as

very expensive and exploitative and would prefer arrangements like that for tomato production where tenants pay rent in cash of about 36,000 Cedis per season.

Yam

According to farmers the cultivation of yam as a sole crop has become important in the community because it has good market. The varieties of yam grown in the community are collectively referred to as *Kumasi Bayere* i.e. yam sets obtained from Kumasi. The varieties are of the Northern Ghana origin and are grown mainly for the Kumasi market.

The seasonal calendar for yam production was detailed as ff. January - land clearing and preparation, mounding and seeding; March/April - staking; August/September - milking; December - harvesting. Within the period picking/weeding is done about 5 times on the average. Farmers indicated that the number of weeding depended on the type of soil and the establishment of canopy. Hired labour is used for mounding at a rate of 4000 Cedis per 100 mounds in addition to feeding the labourer. Bamboo is used for staking. Hundred stakes is sold for 6000 Cedis and 100 poles are staked for 3000 Cedis. Farmers complained that bamboo, a communal resource, has become scarce and one has to trek long distance to harvest bamboo. Many people now obtain it from neighbouring settlements.

Farmers mentioned the high incidence of post harvest losses from rotting due to lack of proper storage facilities as the major management problem associated with yam production. The use of the traditional barn was described as ineffective and mice were reported to speed up rotting during storage. The local solution was mentioned as the storage of the crop on the farm. However, the rampant stealing of yams from farms deter many farmers from adopting this approach.

Maize

Sole crop maize is done by only a few farmers (about four). Many farmers in the settlement regard sole-maize cropping as not profitable. Like rice cultivation, sole maize cropping was mentioned as labour and capital intensive. Farmers use weedicides (Atrazine, sold at 280,000 Cedis per bag, last year). Little or no fertilization is done by farmers who use Atrazine because they said the chemical also acts as fertilizer. Moreover, they also emphasized that the price of fertilizer is too high. Yield on these farms were said to be comparatively higher than on mixed-maize cropping farms.

Seasonal calendar for sole maize cropping follows the same pattern as under mixed cropping. However, some farmers do early maize (planted around November and harvested in February/March) in the valley bottoms.

5.43.2 Intensive vegetable production

Tomato, pepper, garden eggs, okro, onion and cowpea are vegetables done as sole crop. The most important of these crops are tomato, garden eggs and pepper. Vegetable production as sole cropping is regarded by most farmers in the community as capital and labour intensive. Both wet and dry season vegetable production are practiced in the community. Majority of farmers, however, concentrate on wet season vegetable production. Only a few farmers do dry season vegetable

production. Inadequate water supply for production was mentioned as the major limiting factor. Production in the dry season is limited to the valley bottoms.

The main season vegetable cropping starts in February/March and ends in May/June while the minor season starts in October/November and ends January/February. The principal management practices were mentioned by farmers as: land clearing and preparation; nursery establishment; transplanting and fertilization; weeding; spraying; harvesting and marketing. With the dry season production, farmers emphasized that watering forms a major and critical activity. Water is obtained from streams far removed from farms. There are no irrigation facilities. However, some farmers sink their own wells.

The principal management problems were mentioned as: lack of credit; high labour and land hiring cost; and the high cost of agrochemicals. Labour hiring is mainly required for transplanting and harvesting, and also for watering in the minor season production. Men are usually hired for transplanting at 3000 Cedis per day, women and children are hired for harvesting and watering. Labour rate for harvesting is 2500 Cedis per day. The cost for a barrel of water varied according to the distance to the water source. The cost varied between 1000 and 1500 Cedis per barrel.

Farmers mentioned that agro-chemicals form a major proportion (about 60%?) of the total input cost. Double fertilization is practiced by majority of farmers i.e. initial and top dressing. Spraying is done two times before fruiting and thereafter once every fortnight until harvesting. Farmers did not think that spraying up to harvesting could pose a health hazard to consumers. They rather thought that it was expensive but was a good management practice that ensured good harvest.

Farmers indicated that land hiring for vegetable production, especially tomato, was too expensive. The current average rate of 36,000 Cedis per season(not based on hectareage) was considered by most farmers as too high and exploitative.

5.4.3.3 Tree crops

Tree crop farms are mainly cocoa farms. Several individuals have cocoa farms ranging in sizes from an average of 3 to 10 acres. There is a community cocoa farm established in 1989. There are also citrus farms, teak and oil palm plantations. The community Primary and Junior Secondary School(JSS) have established a 2-acre teak plantation near the schools.

The establishment of new cocoa farms is on the increase. Old farms are also being rehabilitated with improved varieties. Farmers mentioned the regular annual increases in the producer price of cocoa as the motivating factor. They, however, conceded several management problems. Weeding was mentioned as the most important. Farmers weed three times on the average within a year in an established farm i.e. in April, July/August and November. In a newly established farm more weeding is required. The major constraint mentioned was the lack of credit to hire labour for weeding which in turn contributes to the decline in crop yields.

Spraying, done in the months of August, September, October and December i.e. four times in a year has reduced to two times. Farmers attributed this to the high cost of pesticides. For example, they indicated that a farmer cooperative which used to supply agrochemical to cocoa farmers In the

community has of late not been able to procure these inputs. Farmers have had to purchase these inputs from the open market. For instance, Uden which the cooperative supplied to farmers at 3000 Cedis per liter was bought at 15,000 Cedis per liter last year in the open market.

Reduction and changes in the rainfall pattern were indicated to have adversely affected yields and periods of harvesting of cocoa. The normal harvesting periods of August (main) and April (minor) were said to fluctuate.

Most oil palm plantations were established on the average about 25 years ago. Consequently, oil palm trees on these farms have been felled for palm wine tapping and are being replanted with improved varieties.

There are few citrus orchards in the community. Most of these farms, like the oil palm plantations, are old. According to farmers, citrus has good market but the crop has for the past three years been experiencing reduction in sweetness in the locality. Farmers could not explain this anomaly. They also complained about the stunted growth of the new varieties that are being established which they attributed to the intensive sunshine and reduced soil fertility in the area.

Many farmers expressed interest in teak cultivation. They indicated that teak was a very good form of security and it has a reliable and good market. However, none of the teak plantations in the community have reached maturity.

5.4.3.4 Backyard gardens

A few farmers have backyard gardens. These gardens are predominantly mixed cropped with staple food crops particularly plantain and cassava, and vegetables. Farmers mentioned crop damage by free ranging livestock especially goats as the major constraining factor in the management of backyard gardens. It was indicated that crops produced in these gardens are rarely sold but used to meet urgent domestic requirements particularly on non farming days.

5.4.3.5 Livestock production

Livestock production is mainly done on free range. Almost every household keeps some livestock. The animals kept are fowls, goats, sheep, and pigs. These animals are all local breeds. Sheep and goats are the major animals kept by households. All livestock, apart from fowls, are confined and are allowed out only after 3pm when most farmers would have returned from their farms. This prevents animals from destroying household items especially food. Traders from outside the community usually come to the community to buy animals especially sheep and goats for resale in Kumasi.

There are only two commercial poultry farmers in the community. They operate deep litter systems. The average stocking capacity on these farms is about 1500 birds. The poultry farmers keep only layers because eggs have good market in and outside the locality. One of the farmers mentioned that local people hardly buy broilers.

Management problems mentioned were mostly related to acquisition and high cost of inputs,

marketing, and accessibility to veterinary services. For example, it was mentioned that day old chicks could only be obtained from Kumasi at 2000 Cedis per layer. Farmers have to make advance payments but increases in prices at the day of collection are added on to the pre-collection price. Farmers complained that if transportation charges are added on to the cost of the chick it makes the unit price very expensive. Also, saw dust, available in large quantities only in Kumasi, could be obtained free but transportation cost is about 25,000 Cedis per trip. Feed prices are generally high with 100 kg. of maize selling at 90,000 Cedis and 50kg. of concentrate at 53,000 Cedis.

The major marketing problem is the high transportation cost to Kumasi with a van load of eggs to Kumasi costing between 30,000 and 40,000 Cedis. Moreover, the glut of eggs in Kumasi has depressed the prices of eggs from an expected value of 6000 to 4000 Cedis per crate of 30 eggs. Veterinary services are available only in Kumasi and can be obtained at cost.

5.4.4 Indicators of peri-urban characteristics

Peri-urban characteristics in farming in the locality include:

- the dependency on Kumasi as the direct and major source of supply of inputs and sale of outputs. Most farmers buy their farm inputs direct from the Kumasi market. For example cutlasses, hoes, fertilizers, improved seeds, etc. are purchased by farmers from the Kumasi market. One poultry farmer indicated that he purchases his maize from Kumasi because it is relatively lower in Kumasi than in the settlement. This same poultry farmer said that he markets his products (both chicken and eggs) in Kumasi.
- acquisition of large tracts of lands by individuals and institutions. This is viewed by farmers as speculative buying against selling at higher prices as Kumasi expands towards the settlement.

5.4.5 Farming systems constraints affected by urban pressures

Farmers did not perceive farming constraints in the community (see 5.4.2.4) as the direct influence of the closeness of the community to Kumasi. However, concern was expressed about the high cost of hiring land for farming which they speculated might get much higher in the near future if the present trend of giving large tracts of community lands to individuals and institutions (mostly outsiders) by the traditional authorities for development projects continues.

Most farmers did not attribute the high cost of hiring land to this reason but rather to the exploitative tendencies of most landlords. It was mentioned that incomes from renting lands are considered very important by many landlords and rates are usually set in relationship with general increases in prices of commodities.

5.4.6 Crop-livestock interactions.

There is very little livestock-crop interaction. For example, only one farmer was mentioned to be using poultry manure for tomato production. The main reason assigned for farmers not using manure

was the lack of knowledge in the use of manure for crop production. Crop residues(e.g. cassava leaves and peels), are, however, used to feed livestock.

5.4.7 Soil fertility status related to farming system

Farmers' perceptions of soil fertility

It was acknowledged by most farmers that soil fertility has reduced considerably. Their major indicator was the reduction in crop yields(30% in recent years). Other indicators of low fertility were loss of tree cover and the presence of grasses such as *Panicum maximum*, *Pennisetum sp.* *Imperata cylindrica*, and "Rawlings grass".

Farmers attributed the decline in soil fertility to tree felling, reduced fallow periods (i.e. from an average of 4 years to 1 year) and bushfires. To improve soil fertility, local farmers mentioned the use of fertilizers and fallow management. They indicated that apart from these two approaches there was nothing they could do to improve the fertility of the soils in the locality which they acknowledged had reduced considerably.

5.5 Trade and commerce

Trading in the area is dominated by agricultural produce. It involves trading in market crops such as rice and vegetables. The increased production in rice and vegetables and food crops such as plantain are due to ready market in Kumasi. Although some traders come to the village to buy food crops, the producers, especially the rice producers, prefer to convey their produce to Kumasi to avail themselves of the opportunity to shop in Kumasi. In addition they enjoy other incentives such as cash advances from their trading counterparts in Kumasi. They also realize that de husking of rice in Kumasi is easier than in the village. Even though there is a rice mill in the village the impression is that it is not reliable.

There are immutable traders in the village, who operate kiosks and deal mainly in provisions and other consumables. Some of the women commute to Kumasi to trade in food crops. Few of the women are hawkers, food processors (cassava, dried pepper and palm oil) and cooked food sellers. Comparatively, few of the men are traders, even though dominate in other sectors.

Generally, the people sell their produce mainly in the village and in Kumasi. Traders from Kumasi and communities such as Abrenkese and Kuntense come to trade in the village

5.6 Industrial sector

Industrial activities in the area can be classified only as informal. It comprises mainly of small scale activities. Some of the youth and active male youth engage in artisanal occupations like fitting and shoe repairing in and outside the village. They are also engage in the construction sector as masons

and carpenters. There exist small scale food processors who are mainly women.

5.7 Other occupations

Some of the youth work as labourers in land clearing. Daily wage for Land clearing is C2,500, this is done mostly by the men. Both women and men undertake weeding for daily wage of C2,000 with food and C2,500 without food. There are about one or two professional office staff who work in Kumasi and the district capital. There are few public servants comprising teachers and nurses. Some of the young women provide services such as hairdressing, dress making and cooked food selling.

5.8 Village structure and organisation

5.8.1. Village structure

The village has a divisional chief who is responsible for their traditional administration. Functionally, the chief performs executive, legislative and judicial roles. The chief is supported by the queen mother and his sub chiefs. They are the main decision making bodies in the village and they also play adjudicative roles. The chief is not resident in the village. However, he visits the village at least once every week, on festive occasions such as Easter or Christmas and on traditional festivities such as 'Akwasidae' or 'Fofie'. The queen mother is also not domicile in the village but pays frequent visits.

Nyameani is under the Bosomtwi-Atwima-Kwanwoma District Assembly. There is an assembly man who represents the village and others at the assembly. The assembly man is resident in the village. He is also a member of the town's development committee. Though the traditional administration is not fully integrated into the district's administrative structure, it provides a viable channel for the initiation and implementation of development projects.

5.8.2 Non-governmental organisations

A number of social groups and organizations operate in the area. These groups concern themselves mainly with the welfare of their members. Notable among these are the Town Development Committee, Mobilization and youth groups, commutial work groups, market women's associations, religious organizations and other local groups.

The TDC comprises 11 men and 3 women. The low number of women is reminiscent of women's aversion to community politics. Generally, women abhor public leadership roles for reasons such as insults from the public, peoples disregard for women leaders and division of time between household duties and public assignments. The committee in consultation with the chief and elders of the village initiate development projects and programs. The committee has been actively promoting the socio-economic development of the people. Some of the projects they have been involved in are a clinic, school and laying of culverts as part of a scheme to put in place proper drainage system.

There are mobilization groups in the village. These are made up of the youth. Currently, two of such

groups exist. Their activities involve hunting for destructive animals to protect peoples farms. They also act as watch dogs over the village at night. The communal work groups are both men and women who work on individual members farms on rotational bases. There are also market women's associations.

There are about 9 religious groups comprising men and women. Their major objective have been to uplift the spiritual status of members and to provide welfare services to members. Their main projects have been farming. Major locally funded projects have included laying of culverts, construction of a clinic and provision of electricity poles.

5.9 Facilities in the village

Existing facilities in the village include schools, clinic, midwife, market, post office, toilets, boreholes and streams.

Only first cycle institutions which are the basis of formal education exist. There is 1 Kindergarten, 2 primary schools and a Junior Secondary School. The major sources of water include 6 boreholes and 3 streams. Although two of the boreholes do not flow constantly the quality of water from the boreholes are said to be good. Each house irrespective of the number of persons pays C6,000 a year as water rate. The fund is used for maintenance and for additional boreholes. All the three streams yield constant flows of water. Two of them are said to have good quality water. The constant flow of the streams could be a contributory factor to flourishing rice production since rice thrives in marshy areas.

There is a daily market in the village. It however consist of make shift structures such as table tops with palm branches as roofs. There are also three VIP toilets and a refuse dump. There is a community health centre in the area. It has resident community health nurses who are currently being housed in the chiefs palace. The centre was built and furnished by the District's Methodist Church .

For other facilities that are non-existent, the people travel to such places as Jachie Pramso (13km), Kuntense (8km) and Kumasi (30km.). These facilities include hospital, weekly market and telephone. The people usually obtain most of their household items from Kumasi.

5.10 Land Use

The village land use is mainly under settlement surrounded by farm lands, forest lands, streams, sacred groves, cemetery and uncultivable areas. (See village map). The built up area consists of houses, a road traversing the village, schools, churches and open spaces. There are now 148 registered houses, between 20 and 40 newly completed houses and 10 uncompleted houses. The newly developed houses are the major changes in the village. The housing expansion has resulted in the dwindling suitable lands for farming. The drainage system in the community is deplorable. As a result run offs from rains, and poorly organized facilities for channeling domestic effluent is causing serious inter- house soil erosion. Many houses have eroded foundations.

The farm lands encircle the village. The constituents and quality of land is a determining factor for the type of crops grown. Due to relative pressure on land the length of fallow in the community range between 2 and 10 years. Although vegetable farming is an important activity, farmers do not practice rotation of crops. Since the past decade the amount of land invaded by spear grass has increased and land for farming is becoming limited: The community is not endowed with sand or stone. The people acquire them from Jachie, Esreso and Feyiase.

5.11 Land access and management

Customarily, land in Nyameani belongs to the stool. The occupant of the stool allocates land to families and these lands are administered by the family heads. Thus land in the area is generally owned by the indigenous people. Distribution, allocation and cultivation rights of stool lands are administered by the chief and that of family lands by family heads. The mode of land acquisition are mainly by family, share cropping, hiring, lease and outright purchase. Family members cultivate family lands. Depending on the suitability of the soil for certain types of crops some indigenous people might have to consult other families for land for farming. Those who do not get adequate land or who for other reasons such as family litigations could not use their own family lands approach other families and negotiate on the terms.

Migrants who need land for farming will have to approach the chief. They may also contact family heads. Migrants who acquire family land do not own them. The same tenurial arrangement on land for farming applies to both immigrants and natives. These are mainly hiring and sharecropping. Hiring is mainly for vegetables. Prices for 1/2 an acre valley bottom land cost C40,000 for a season. There is no sharecropping in vegetable cultivation. Cash payments and abusa are not used for food crops. Only the Abunu where the tenant pays for inputs are applied. Though vegetable cultivation is an important economic activity, farmers do not practice rotation on valley bottom vegetable farms.

Easy access to land is being threatened due to increase in demand for fanning, residential and other developmental purposes. It was gathered from the field that the traditional extensive farming orientation and the resultant farm fragmentation pertains in the area.

The chief in consultation with elders, committee members and the Town and Country planning initiates the layout for the village. The chief plays the major role in allocating plots for residential, industrial and any other development project. Currently the village has no layout, however plots for residential development are said to be available to the locals only. Those who acquire such lands at the moment pay C60,000 as the 'drink' or token fee for a plot of land. Currently, no plots are being sold to 'strangers'

5.12 Access to and management of other natural resources

5.12.1. Timber and Non Timber Forest Products

The forest provides timber, fuelwood, food, game and medicinal plants. Men are responsible for hunting. Both men and women gather plants for medicinal use. Though access limitations has reduced reliance on certain forest products like timber or logs, game (during certain periods) the forest is still essential to the life and traditions of the people especially the poorer families.

With regard to land and forest resources the old people have much control in that they are already in possession of the resources thus the youth have to seek permission from them for usufructuary rights. There was however no impression that anyone has lost out.

Even though forest products and other natural resources are generally suppose to be common property they mainly involve products that grow wild such as oil palm and herbs. In the case of logging one will have to contact the chief and the land owner for permission. With fuelwood, they are mainly gathered on individuals farms or family lands. However one could gather wood fuel from other peoples lands free but it is expected that the land owner is informed. Common tree species include 'Okro'(Albizia zygia), 'Nyankyerene'(), 'Wawa' (Triplochiton scleroxylon). Fruit trees though are said to be common property but you can only pick fruits that have dropped. Fruits plucked can be confiscated by the land owner.

5.12.2 Water

Women and girls are primarily responsible for carrying water from communal boreholes and other water sources. There are taboo days when people are not allowed to visit some of the steams. In the case of boreholes, no such restrictions apply. The water sources and refuse dumps are cleaned by women every two weeks whilst the toilets are cleaned by school children. They are supervised by the village committee. In this respect the role of women as community managers becomes certified. The committee takes up maintenance of the water and sanitation facilities.

5.12.3 Sacred grove

The village, like many communities, observe certain days as taboo days. On such days some natural resources and or farmlands are not to be visited. In some instances you could visit the area but you are not allowed to work. Those who disregard taboo days are made to pacify with sheep. The village has a sacred groove reserved for traditional religious purposes. The groove is about 5km, it is the abode of village's idol. The 'twafohene' controls the groove. He performs or lead in sacrifices in the grove and he only has the right to go there during certain times.

5.13 Development of the village

The community has experienced some development for the past ten years. Visible changes in Nyameani are new residential houses, existence of boreholes, tarred road traversing the village. Churches are also undertaking building projects. Some of these development could be described as part of the trickling down effect from increased income from rice and vegetable production. The chiefs and elders enumerated the village development priorities as Nurses quarters for the existing clinic, VIP toilets, community centre, renovated school buildings and industries for employment avenues. Thus generally they want infrastructural development. The women rather mentioned electricity. They all perceived social vices such as thuggery, teenage pregnancies to be associated with any future urbanization.

5.14 Urban influence

Proximity to Kumasi and Kuntense the district capital has influenced the social and economic lives of the people. The major contributing factor is the good road network, and improved transportation. At the moment people are served by about 4 taxis and trotro (local mini buses) per day. Currently, about 100 people commute to Kumasi daily. This development has in no small way boosted commercial activities by providing higher price incentives and ready market for their farm produce. It must be noted however that it is mainly the male youth and a few others who are involved in rice production who have benefited most from the market in Kumasi. Kumasi also provides manufactured merchandise to the village. Women who dominate in merchandise trade have also benefited.

Observably, the link between Nyameani and other bigger settlements has exerted some influence on the socio-economic lives of the people. Proximity to Kumasi has boosted trading in rice and other food crops in the village. The village also relies on the cities for other basic necessities. Other changes in the village that could be attributed directly or indirectly to the link include increasing housing development. This is being done mainly by the indigenous people who are in good businesses both in the village and outside. Current rents in the village per room per month is between C1,000 and C1,500. These are rented by farm hands from the North who come seasonally to offer farm labour and to civil and public servants such as teachers and agricultural extension officers.

6. *Domeabra*

Position 1°51'W, 6°95'N. North-east of and about 40km from Kumasi; 8km off the Kumasi-Mampong main tar road.

Participatory village map

6.1 History/Origin

The first settlers originated from Adansi Akrofuom. They were members of the Asona clan and numbered around 100 people. This seems quite high so it might have happened that something like an epidemic or war compelled them to move. They first saw the Asantehene who told them to find a place to settle. So they first settled at Abrakaso. Their original occupation was hunting so when they saw the present site in their hunting expedition, they moved from Abrakaso. Originally they called the place Muawano (keep quiet). The settlement was so far away from the major town so it was renamed Domeabra - (if you love me come) as only die hard friends were prepared to walk that distance to visit.

6.2 Population and livelihoods

The current population is estimated at 1500 with about one-third (521) as registered voters according to the 1996 voter register. It is dominated by indigenes who form about 75% of the population. The 25% migrants are mostly Ghanaians from the northern and southern sectors of the country with few from Burkina Faso. The high proportion of migrants indicates that the population is growing by both natural increase and migration. According to the people, more migrants have moved in within the last 10 years. Some of the migrants especially, those from the north, have moved in to undertake fanning and also to provide farm labour. Those from the southern part of Ghana, have immigrated to mainly engage in Kente business, either as weavers or customers of the kente business. Kente weaving is one of the main occupations in the village. The natives who emigrated did so with the aim of learning a trade or to attend school (mainly second cycle school). No native has moved out because he/she has no land to farm.

6.3 Economic development - overview

According to the people hunting moved them to settle at Domeabra. However, with time they settled down and turned to farming to produce food mainly for subsistence. They later turned to cash and food crop farming. However kente weaving and vegetable farming are also gradually emerging as a major occupation especially for the youth.

About 50% of the men and more than 90% of the women are farmers. More than 90% of the farmers have farms in the village. The rest have farms in the surrounding villages with some of the men having farms in the other regions. The rest of the people are involved in non-agricultural occupation as teaching, trading, shoe repairing, dressmaking and hair dressing. It must be noted that most people undertake farming as minor occupation apart from their major job.

Some farmers however combine crop farming with poultry and livestock including sheep, pigs and fishponds.

6.4 Detailed analysis of farming systems

6.4.1 Farming systems categorisation.

The following farming systems were identified :

1. Bush fallow food-crop farms
 - maize-cassava-plantain-cocoyam-yam-vegetable-intercrop - maize and cassava sole cropping
2. Intensive vegetable production as sole crop
 - tomato, garden eggs, cowpea.
3. Valley bottom rice and taro production as sole crops
4. Tree crops
 - oil palm, cocoa, teak, citrus
5. Livestock production
 - free range small scale household production(sheep, fowls, pigs)

6.4.2 Characteristics Common to all Farming systems

6.4.2.1 Inputs

Fertilizer is used by vegetable farmers especially tomato producers. The fertilizers used by these farmers are NPK(15:15:15) and Sulphate of Ammonia. It was mentioned that other farmers do not use fertilizers because they think fertilizers are too expensive. Farmers said a mini bag of NPK and Sulphate of Ammonia are bought at 34,000 and 13,000 Cedis respectively. Farmers, however, emphasized that fertility of their soils has reduced and would like to use fertilizers.

Vegetable and cocoa farmers spray their farms with agro-chemicals. Vegetable farmers use Kocide, Triden, Karate, Dithene and Sampi. Cocoa farmers use Uden. Farmers said they buy all these inputs from Kumasi. Rice farmers use weedicides particularly Stam.

Farmers do not use organic manure but the local farmers indicated that they have heard about the use of poultry droppings for improving soil fertility. However, farmers admitted that they do not know how to use to use organic manure. Farmers also wondered where they would obtain organic manure from after they have been educated about its use since there are no poultry farms in the community. They said the nearest settlement they can obtain organic manure, is Jamase (20 km. away) and farmers are not likely to obtain sufficient quantities. Kumasi is where farmers said they could obtain adequate organic manure.

Maize farmers use improved varieties (Okomasa and Obatampa). All other crops are of local varieties. Vegetable farmers also use improved varieties. Tomato farmers use improved seeds as parent stock. They said subsequent seeds are selected from farmer's yield. It was mentioned that most of the improved seeds bought from the market do not give good yield and the fruits also crack easily when it rains. Therefore farmers select their seeds from the fruits that have become adapted to the local environment.

Farmers use a combination of hired and family labour. Labour rates per day are 2500 Cedis for weeding and hand picking; and 3000 Cedis for land clearing and preparation (all inclusive of food). Tomato farmers were mentioned to give some farm activities (especially ridging) on contract basis. Rice farmers in the community use the nnoboa (particularly women's labour) to sow rice. It was indicated that seasonal labourers from the north of Ghana form the majority of farm labourers. They come to the community in December and leave around May.

Majority of farmers use family lands. Sharecropping is also common in the settlement with cassava done on the basis of abunu while maize is abusa. Cocoa is shared on abusa basis if the tenant is a caretaker but as abunu if the tenant established the farm. And in the latter case the land also becomes the bona fide property of the tenant. However, farmers said that this arrangement (cocoa done as abunu) is non existent due to increasing land scarcity.

6.4.2.2 Outputs

Yields of all crops were said to have reduced by an average of a third. Farmers attributed this reduction in soil fertility due to continuous cropping (especially on tomato plots and rice fields) and reduced fallow periods. Fallow periods were said to have reduced from an average of 6 to 2 years.

6.4.2.3 Marketing and storage

Farmers said most food crops are sold at Agona, the district capital and the nearest major market on Tuesdays (the market day). Cassava is mostly marketed by the farmers direct at Agona but few farmers come from Kumasi also to buy cassava in the settlement. Maize is mainly stored and sold by farmers when prices are good. It was emphasized that very few farmers sell fresh maize. Rice was mentioned as the crop that farmers mostly sell in Kumasi.

Farmers indicated that its only maize that has elaborate storage facilities. But majority of farmers use the traditional barn. A few farmers use the improved crib and preservatives(particularly actellic)

6.4.2.4 General constraints

Farmers ranked constraints to farming in the locality as the following:

Problem	Score
Diseases and pest attacks	3
Inputs(high cost)	2
Marketing(low prices)	2
Poor extension services	2
Credit	1

Disease and pest attacks on crops and livestock were said to very prevalent in the settlement. For example, it was mentioned livestock suffer from skin diseases; mistletoe attack cocoa and oranges; and termites are common and attack plantain and cocoyam.

Farmers mentioned the high cost of sprayers and agro-chemical. One elderly female cocoa farmer bemoaned the scarcity of mist blowers and unavailability of implements for plucking mistletoes from cocoa trees. She said the younger farmers climb the cocoa trees to pluck off the parasite but she cannot do it. The high per of cutlass (6000 Cedis) was also indicated.

The prices offered for maize, cassava and tomatoes during bumper harvest was said to be ridiculously low. For example farmers said last year they sold a mini bag of cassava for 4000 Cedis and a crate of tomatoes(main season) for 20,000 Cedis. Farmers were particular about the erratic price fluctuations of tomato.

It was indicated that extension officers hardly come to the settlement. Farmers also emphasized that when the extension officers come they devote all their attention to maize farmers.

Farmers said they do not have access to any credit facility and they have also not benefited from any credit scheme. They said credit is needed to buy inputs and to hire labour.

6.4.3 Management of specific farming systems

6.4.3.1 Bush fallow food-crop farms

The bush fallow food-crop farming system in the locality comprise maize-cassava-plantain cocoyam-yam-vegetable-intererop and maize and cassava sole cropping. intercropping is the predominant farming system in the locality.

Mixed cropping

The seasonal calendar for the intercropping system was given as:

Jan-Feb	Land clear jag and preparation: most farmer use hired labour.
March	Planting: farmers plant maize; first followed two weeks by cassava plantain, cocoyam, yams, beans, pepper, onion and garden eggs.
April-May	First weeding.
June	Harvesting of fresh maize and vegetables: sales are done locally
July-August.	Second weeding
August-Sept.	Harvesting of dried maize: sales are done locally or at Agona.
October-Nov	Third weeding, harvesting of cocoyam and some cassava, (for domestic consumption).
February onwards	Harvesting of cassava, yams, plantain and other crops: complete harvesting of cassava and yam for sale; plantain is harvested on piece meal and used mainly for domestic consumption. Few of plantain is sold.

It was mentioned that most mixed croppers are aware of intercropping with legumes to take advantage of their capability to fertilize the soil. For example, some farmers grow cassava, beans and maize together. They plant beans first and two weeks later plant maize and cassava. There exist also groundnut and maize combination done mainly on lower slopes. In this system, farmers said

maize is done as the minor crop to defray the cost of producing the groundnuts. They said some farmers also grow cassava on these plots after harvesting the groundnuts. It is noteworthy that farmers recognize that mixed cropping is not good for achieving higher yields per crop. They said they sole cropping gives better yields but most farmers cannot practice that because they cannot obtain large tracts of land.

Farmers mentioned the major constraint with mixed cropping as the lack of credit to hire labour to weed their farms. However, tenant mixed croppers said they are quite happy with a new tenancy arrangement that allows them to take the whole of the maize and share the rest of the farm produce equally with the landlord. Farmers said this new arrangement is to enable tenant farmers to use the money from the sales of the maize to finance weeding of the farm.

Sole Cropping

Maize as sole cropping is done by few fanners who have large tracts of land. Most of these fanners use improved varieties mainly Okomasa and Obatampa. It was mentioned that these fanners practice row planting and they obtain better yields. These fanners also use weedicides particularly Atrazine but no fertilizers. They said the Atrazine fertilizes the soil so they do not use fertilizers.

Cassava as sole crop id done in rotation with tomatoes. Farmers said this is done especially on upland areas and done with wet season tomato production. Farmers believe that the cassava planted after harvesting the tomatoes take advantage of the residual fertilizer used in the production of the tomatoes.

Yam is produced as sole crop on middle slopes purely on commercial basis. This activity is done by farmers who have large tracts of land in these areas.

6.4.3.2 Intensive vegetable production

Vegetables are regarded by farmers as the most important among the sole cropping systems. Farmers do mainly tomatoes and produce the crop three times within a year: Sukane (first rain production); main crop (wet season production); and Petra, the dry season production.

A typical seasonal calendar for the main season (wet season) tomato production was given as follows:

May	Land clearing and preparation:- farmers use a combination of hired and family labour, but mainly hired labour at 3,000 Cedis per day; Nursing of seeds:- done two weeks after land preparation; farmers use their own labour; Stumping:- this involves removal of stumps ; done after nursing the seeds with farmer's own labour
June	Ridging/beds preparation:- most fanners use hired labour; this is done contract basis at rate of 30,000 Cedis per acre; Transplanting:- farmers use their own labour;

First fertilization(done two weeks after transplanting):- farmers use NPK and their own labour.

First weeding(2 weeks after transplanting):- farmers use hired labour,

July First spraying(four weeks after transplanting); farmers use Dithane, Kocide or Karate but most farmers said they use the Karate because it is very effective; its application rate was given as 15 mils. To 1 barrel of water and spraying is done once every week till harvest; the first spraying is followed with second fertilization; farmers use mainly sulphate of ammonia;

Second weeding and re-ridging.

August Harvesting:- most farmers use family labour.

Farmers said yields depend on rainfall and the fertility of the soil and 100 crates per acre is regarded as good yield. Tomato produced is sold mainly at the Agona market and few traders sometimes come from Kumasi to buy at the farm gate. Last year, the main season crop was sold between 20,000 and 25,000 Cedis per crate.

Among the problems identified by farmers were declining fertility of soils in the area and the lack of "virgin" lands for tomato production and the low prices offered for tomatoes during the main season. They also indicated the lack of irrigation facilities for watering during the dry season production. Watering was regarded by most farmers as the most difficult activity and farmers can only crop about a quarter of their normal farm size during the dry season. However, farmers admitted that they obtain better prices and higher incomes in the dry season.

Farmers said they wanted government intervention in the provision of small irrigation schemes for dry season production, supply of agro-chemicals at reasonable prices and price stabilization of tomatoes especially during the main season. They also indicated that the government should supply spraying machines directly to them because the current prices of knap sack sprayer (600,000 Cedis) and motor blower (800,000 Cedis) are too exorbitant and they cannot even find some to buy at these prices.

6.4.3.3 Specialised valley bottom farming *Rice*

Rice is an important cash crop in the locality. It was mentioned that its production used to be a major activity and farmers used to do both upland and valley bottom production. Presently, however, farmers do only valley bottom production. The reason given was the lack of long fallowed lands (6 years). Farmers indicated that weeding becomes a major problem when they crop on short fallowed lands. It was emphasized that the unavailability of large tracts of farming lands has made impossible for many farmers to practice long fallow management.

The seasonal calendar for rice production was given as the following:

February-March	Land preparation
April	Planting; farmers use the nnoboa system(mainly women's labour) for planting; only local rice varieties(red and white) are cultivated
May	First weeding(hoe weeding)
June	Fencing of farms to ward off grass cutters which are attracted by the smell of the rice. Farmers said that these animals can cause massive destruction to crops.
July	Second weeding. This is mainly done by hand picking. Some farmers said they use weedicides especially Stam. The agro-chemical which farmers complained was too expensive (60,000 Cedis per gallon) is mixed in a ratio of one milk tin to the container of the mist blower.
August	Harvesting; birds have become a major problem and cause a lot of pre harvest losses.

Farmers said land for rice production is hired at a rate of 25,000 Cedis per acre. Land owners do not demand payment in kind. The major problem farmers mentioned was marketing. They indicated that farmers transport the rice to Kumasi at a cost of 300 Cedis per bag to mill and sell to traders who mainly come from Obuasi and Nzema (Western Region).

Farmers mentioned that millers and traders collude to cheat farmers by buying the rice with measures larger than the normal measure. They said the system is the same every where in Kumasi and farmers do not have any alternatives. For example, the normal measure which is about 5 tins per maxi bag is reduced to 4 tins per bag and a tin is sold for 10,000 Cedis. Thus a farmer loses about 10,000 Cedis per every maxi bag of paddy sold.

Taro

It was mentioned that most farmers who have lands in the valley bottom in the settlement do taro production. Farmers confirmed that the settlement has large tracts of valley bottom land. They said taro is done only in the valley bottom.

Farmers recognize taro as a good crop because once it is established it can survive for a very long time and gives sustained income. They said it does not require much labour and the cost of production is relatively low compared to the production of other crops.

It was mentioned that the crop is grown mainly for cash but serves as good subsistence crop during the hunger period (i.e. when farmers are starting a new cropping season especially between January to May). Traders come from both Agona and Kumasi come to the settlement to buy taro.

6.4.3.4 Tree crops

Tree cropping systems comprise cocoa, citrus, oil palm and teak plantations. There are many cocoa farms in the settlement but most of them are old farms averaging about 20 years. It was mentioned

that cocoa production has assumed importance lately in the settlement and this is mostly to do with rehabilitation of old farms. An old caretaker said that most of the virtually abandoned farms are

being rehabilitated and new farms are being established. He attributed the upsurge of interest in cocoa farming to the high purchasing price of cocoa.

A typical seasonal calendar for rehabilitation and maintenance of cocoa farm was given by a caretaker whose farm was visited as follows:

April	Minor harvest
June-July	Planting of seedlings as part of rehabilitation of the farm: seedlings are nursed from seeds from the farm and that from agric. Station(improved variety); First weeding: farmers use hired and family labour;
August	First spraying and main harvest
November	Second weeding
December	Second spraying

Mention was made of several management problems. For example, farmers indicated that spraying used to be done four times in a year (i.e. August, September, October and December) but most farmers do it only two times in a year. This was attributed to unavailability and high price of Unden. It was mentioned that Unden is sold at government approved price of 3500 Cedis per liter but most farmers buy the agro-chemical in the open in Kumasi at 12,000 Cedis per liter. They said farmers in the locality do not get the government supplies as a result of corruption within the government distribution agencies. The tenant farmer whose farm was visited lamented that all the old trees in his farm are dying due to the lack of spray. He said he used to get supplies from the Formulation Plant of Cocoa Marketing Board (CMB) in Kumasi but does not get supplies any more.

High cost of labour for weeding was also mentioned. Most farmers are able to weed their farms once every year instead of twice. Labour rate of 3,000 was indicated by farmers (especially caretakers) as very expensive. Majority of the old farms are under abusa system where the tenant takes a third of the proceeds but is expected to maintain the farm. Caretakers said they do not earn enough to hire labour to assist in farm in weeding their farms. It was emphasized that this seriously affect yields.

Clearing of mistletoes is another problem mentioned by farmers especially older farmers. Lack of plucking tools compel many fanners to climb some of the trees to rid them of mistletoes. Farmers admitted that the trees which they cannot climb are not treated. It is the urgent need of farmers to be supplied with plucking tools.

Farmers said yield has drastically reduced as compared to about ten years ago. They said yields are about half what was obtained previously. Most farmers attributed this their inability to obtain chemicals for spraying and lack of credit to hire labour to weed their farms. Farmers sell their cocoa locally. There exist the deduction of kilo of cocoa from each bag that farmer sells popularly known as kilo-kilo for community development.

Oil palm farms in the community are established mainly on lower slopes and edges of valley bottoms. Most the farms are given on abusa to tenants. Problems farmers identified with oil production were high cost of improved seedlings; and the use of wrong seedlings(some farmers complained that the seedlings they bought does not fruit). Farmers however admitted that the crop

has good market (the local measure is sold for 4000 Cedis) and that local women buy the fruits for sale at Yeji in the Brong Ahafo region. It was mentioned that some Malaysians have indicated their intention to establish an oil palm nursery in the settlement.

The only teak plantation in the settlement was established by the community for future electrification of the community. The plantation, about 4 acres, was established about three years ago with communal labour and community funds (purchase of seedlings).

Citrus are established on the middle slopes and most of them are quite close to the settlement. These farms like the cocoa farms are also very old. One farm that was visited had been established about 30 years ago. Farmer emphasized that citrus has good market and that traders come from Kumasi and the surrounding settlements to buy. Last year a mini bag of oranges was sold for 6000 Cedis.

Farmers said that more people prefer to do tree crop production because it gives better security in terms of secured income every year. However, farmers pointed out that because farmers do not have large tracts of land they are compelled to use the little they have for food crop production. One farmer referred to their lands as *didi asase* (i.e. land for subsistence). It is of interest to note that farmers anticipate that in spite of the land problems many farmers will go into oil palm production because the lower slopes and fringed of valley bottoms would be used the production oil palm production.

6.4.3.5 Livestock production

Livestock is produced mainly at the household level and on free range. Almost every household keeps some fowls but this is meant for domestic consumption. Farmers sell fowls only when they are in dire need for cash. Many farmers keep sheep which are mainly for sale. Goat is tabooed. One person does pig production. The pigs are penned and fed with cassava and plantain peels as well as pawpaw leaves. They are slaughtered and sold locally.

Sheep rearing is regarded as the most important livestock activity. The animals are kept in pens fed with cassava and plantain peels and allowed to graze in the evening in the company of shepherds. A sheep that wanders about is caught and the owner fined 2,000 Cedis. The money is paid into the community treasury. The owner is also made to pay for any crop damage to the farmer. The sanction is enforced by the Village Development Committee and has legal backing of the District Assembly by law on the environment. Consequently, if a livestock owner does not pay the fine locally and is reported to the District Assembly the fine is doubled.

Sheep is sold to traders who come to the settlement. Farmers mentioned that the trade is dominated by alien Malian from Kumasi. Some chop bar operators from Agona also come to buy from farmers. Farmers said they obtain good bargain because traders come to the settlement to buy.

Problems farmers mentioned included disease attacks (swollen jaws, diarrhoea and skin diseases) and lack of extension services. It was emphasized by farmers that the veterinary officers at Agona never come on their own to the settlement. Farmers have to go and request for their services and it was reported by farmers that for every sheep they attend to the farmer pays 500 Cedis. The lorry fare of the officer(s) also has to be borne by the farmer. It was mentioned that for these reasons most

farmers do not go for them and others said they do not even know of their existence.

Farmers also mentioned that construction of a pens is laborious. They also said they do not roof their pens because of high cost of roofing sheets. Consequently, the animals are subject to the elements of the weather.

6.4.4 Indicators of peri-urban characteristics

The sale of some outputs and the purchase of some inputs from Kumasi was given by farmers as the only indicators of farmers dependency on Kumasi. For example, the sale of sheep depends mainly on traders from Kumasi. The sale of rice is also done solely in Kumasi. Farmer said most agrochemicals are purchased from Kumasi. However, farmers emphasized that they do most of their transaction in the Agona market.

6.4.5 Farming systems constraints affected by urban pressures

Farmers did not consider any of the farming constraints in the settlement (see 6.4.2.4) as emanating from an urban pressure. They thought that the most important farming constraint (pest and diseases attacks) was a local problem. They felt that has more to do with the poor extension services provided by the extension staff at Agona and not an urban pressure.

6.4.6 Crop-livestock interactions

Farmers do not use organic manure but the local farmers indicated that they have heard about the use of poultry droppings for improving soil fertility. Crop-livestock interaction is the feeding of sheep with cassava and plantain peels, and pigs with the same waste plus pawpaw leaves.

6.4.7 Soil fertility status related to farming systems

Farmers' perceptions of soil fertility

Farmers said they use yield as the major indicator of soil fertility. They mentioned that how long a piece of land has been left fallow is also used as an indicator of the fertility status of the soil. They recognize a fallow period of 6 years as good enough to restore soil fertility. Invasion of grass (*Imperata* spp) also signaled reduced fertility. Farmers thought that the fertility of soils in the locality has reduced and attributed the situation to the following reasons:

- shortened fallow periods: reduced from an average of 6 years to 2 years as a result of increased pressure on lands due to population increase;
- continuous cropping; and
- loss of tree cover.

The burning of debris or burning as a means of land preparation was not considered by farmers as detrimental to soil fertility. Farmers said soil fertility can be improved by the use of fallow management and fertilizers.

6.5 Trade and commerce

Trading in the village is dominated by both agricultural produce and kente clothing. The women dominate in agricultural produce while the men deal in kente. Some of the villagers operate kiosks and deal mainly in provisions and consumables. There are some women who also sell cooked foods. Generally the people sell their produce in the village and Agona in the case of food crops while vegetables and kente cloths are sold in Kumasi as well.

6.6 Industrial sector

The major industrial activity in the community is kente weaving. It is next major occupation among the men especially the youth. About 40% of the youth are engaged in this business. According to the youth they prefer kente weaving because apart from getting ready market in the village and in some cases they get financial assistance in the form of inputs from would be customers. The rest of the men are in such trades as shoe making. Non-agricultural occupation undertaken by the women include hairdressing, gari processing and dress making.

6.7 Other occupations

There are some salaried workers mainly in teaching. The young and active population also undertake other jobs such as land clearing for wages. Daily wage for land clearing is ₵2000 with lunch supply. Other jobs like destumping, tree felling and mounds attract wage of ₵2500, 5,000 and 2,500 respectively with lunch supply. A farmer however pays ₵500 extra if he is not able to supply lunch for the labour in all cases.

Other minor occupation for the women includes farm weeding for a wage of C2000 and head loading of food crops especially cassava and vegetables (conveying farm items from farm gate to the village). Few of the women are office workers especially in teaching.

6.8 Village structure and organisation

6.8.1 Village Structure

The village is under a village chief who is under the Ejisu paramountcy. The village does not have a substantive queen mother.

Administratively, the village is under the Afigya Sekyere District Assembly. There is an Assembly man resident in the village and represents the community and a couple of other communities in the

District Assembly which has Agona as the district capital.

6.8.2 Non-governmental organisations

There are various social and developmental organizations in the village. Notable among them are the Town Development Committee (TDC), Tomato Growers and Kente weavers associations, Religious organizations and Political parties. The TDC consists of 7 men and 2 women. They initiate development programmes and projects in consultation with the Assembly man, Chief and elders of the village. These projects are usually undertaken using communal labour with some monetary contributions when the need arises. There are a number of on-going projects in the community. Currently the people are providing communal labour towards the construction of a clinic and the erection of electricity poles. The district assembly is also constructing a school block and a bore hole. The tomato growers association comprises all tomato growers irrespective of sex. Kente weavers association also comprises all kente weavers in the village. They are however welfare associations specifically for the welfare of the members. There are 7 religious organizations made up of men and women.

6.9 Facilities in the village

Facilities in the village include wells, streams, toilet, and school. There are 2 wells which are not enough for the village population, especially in the dry season when the streams dry out. The women weed around it on Sundays to keep them clean. There are four streams in the village which serve the village in all domestic uses until the drilling of the wells. Unfortunately, they dry out in the dry season thus bringing much pressure on the wells. There is a stream of schools comprising 1 Kindergarten, 1 Primary and 1 J.S.S, all located in one compound. There is no market in the village and traders use table tops, street sides and kiosks for selling their wares. The people attend daily and weekly market in Agona and Kumasi. There is a pit latrine with two separate apartments for men and women. School children are responsible for cleansing and sweeping its surroundings every Sunday. There are no health and communication facilities and residents travel to settlements *such* as Agona and Asamang to enjoy these facilities.

The development of urban areas (such as Agona) close to the village has enabled the people to get access to facilities as health and communication. This relationship is facilitated by good access road which is motorable throughout the year.

6.10 Land Use

The village is connected by a graveled road to the main Kumasi-Mampong road. The village land use consists of the built up area surrounded by farm lands, fallow lands and cemetery. The built up area consists of houses, schools, churches, the main road and open spaces. The new and uncompleted houses, the clinic and school blocks are the major changes in the village in recent times. They are the result of expansion in the village to meet demand for accommodation, education and health facilities.

Conspicuously seen among the new and uncompleted houses are wattle and daub houses with thatch roofs, mainly built by the migrants from the northern part of the country. Within the built up area, erosion and drainage are problems facing the people.

The farm lands comprise cash and food crops and vegetables. Vegetable farms are mainly along the streams. Fallow lands are left for periods ranging between 4 and 10 years indicating availability of land for farming. However invasion of spear grass has increased due to the slash and burn method of farming.

There is no sand and stone winning site within the village land. Sand for housing are bought from the nearby villages especially Abrakaso and that is supposed to account for the wattle and daub houses found in the village as most people cannot afford the cost of buying sand from another village.

6.11 Land access and management

Land belongs to the stool and it was the occupant of the stool who allocated land among the families. A portion of land has however been kept for the stool. This piece of land becomes the property of the occupant of the stool at any time and it is the occupant *who* has right to farm on it.

Land for housing and community projects is allocated by the chief in consultation with the Krontihene and the Town Development Committee (MC). The Krontihene and the TDC demarcate housing plots. There is no layout plan for the village so they depend on their judgement as to which site and size should be allocated for a particular project. A family whose land is taken for development is not compensated in any other way. Currently, indigenous people pay ₵30,000 and migrants pay ₵40,000. The low figure quoted for migrants is due to the fact that those *who* need plots are people who have stayed in the village for long periods and have properties or are working in the village and have decided to stay in the village.

Local farmers have access to family lands for farming activities. Some natives are however short of land due to population increase and/or long absence from the village. It could also be due to the allocation of their land for housing or community projects. Such natives may consult other family heads or individuals from other families with adequate land for a piece of land to farm on based on terms ranging from hiring to share cropping. Migrants may get land by approaching family heads or family members and negotiate on terms of hiring or share cropping.

According to the people, hiring arrangements for vegetables attract cash payment between ₵ 10,000 and ₵20,000. In the case of food crops, hiring for maize and cassava attract between ₵20,000 and ₵30,000 for 2 years. When plantain is planted, hiring is for a period of 5 years and attracts a rent of ₵30,000 to ₵40,000.

In the case of share cropping, abunu tenancy exists for both vegetable and food crop farming. For vegetables, the land owner provide land and inputs like seeds and fertilizer while the tenant provide labour. After harvesting, the cost of the inputs are deducted and profit share on 1:1 basis. In the case of food crops, the tenant clears land and provide inputs (cultivate). The land is then shared on 1:1 basis. Another arrangement is cocoa for food. If land owner wants to plant cocoa, then he gives out the land to anybody who is prepared to plant the cocoa and take the food crops on the farm. In such a case the landowner provides only the cocoa seeds and it is estimated that by the time all the food crops are harvested, the cocoa trees ought have reached maturity and the owner takes over.

Access to land is not the same as in the past decade and a half ago. Cocoa is still being grown and coupled with housing and other physical developments, land for food crop and vegetables have been reduced. The increased population has therefore brought competition on land for farming such that cash rental is now more practiced than ever. Housing rental range between ₦1,500 and ₦2,000 for a single room for a month.

6.12 Access to and management of other natural resources

6.12.1 Timber and Non Timber Forest Products

The natural resources on land are supposed to be common properties but are controlled by the land owners. Fuel wood, and wild growing oil palm trees are controlled by landowners on which these resources are found. Medicinal plants are however communal property though one has to see the landowner as a matter of courtesy to have access. There is no forest reserve in the village, however the land is timber concession and individual land owners have to get permission from the District Assembly before he can fell a tree for building purposes. Hunting is done by men (both old and young) and no permit is required.

There is no sacred grove in the village.

6.12.2 Water

There is no restrictions on access to water. Water from the wells and stream are used for all purposes. There is however restriction on the extent to which farming (clearing) can be done close to the stream bed. A strip of fallow land is required to be left along the stream. Pressure on land and the emergence of vegetable farming have made people violate this and weed close to the stream. There are no taboo days on which the stream is not visited. Fishing in the streams is done by both men and women. Fishing is however banned during certain months of the year. The streams dry out in most part of the year. Streams are not visited on taboo days.

6.13 Development of the village

The visible improvements in the village within the past 10 years are housing development and school block. However most houses are built of wattle and daub with thatch roofs. In the near future, the peoples development priorities are completion of the clinic block which is almost ready, 2 more wells in the form of bore holes, electricity and craft centre in the form of a vocational school and a bakery.

The women's priorities in order of preference are bore holes, electricity, clinic and vocational centre for the female school leavers. According to the youth however, opportunities like prior knowledge in weaving by both men and women exist for a smooth take off of a craft centre. Their major priority after electricity is a craft centre where they can learn modern methods of weaving and other handworks like dressmaking. There is high communal spirit and commitment for community projects. Electricity poles for the town have been procured. There are available labour and many

villages surround the village which can patronize the clinic and vocational school. According to one informant, there is now high response to education by the children and town's people. They however envisaged some problems like social vices, high cost of plots, and landlessness which may result from the implementation of these projects that are likely to attract more people and housing developments.

6.14 Urban influence

The urban influence in the village is facilitated by the improved road network and transportation to Agona. Currently trotros make about 6 trips and taxis 40 trips conveying people to and from Agona to join buses to Kumasi. About 10 people travel to Kumasi daily from the village. The easy access to Kumasi appears to have influenced the increase in vegetable production and Kente weaving. Vegetables and Kente cloths have large and buoyant market in Kumasi. It was learned that traders from Kumasi (especially those indigenes who stay in Kumasi) travel to the village to buy such vegetables as tomatoes. Some migrants from Kumasi have also established shops where inputs in Kente weaving are sold and also buy the finished kente from the people. It must be noted that some people take their cloth and crop to Kumasi and Agona to sell.